



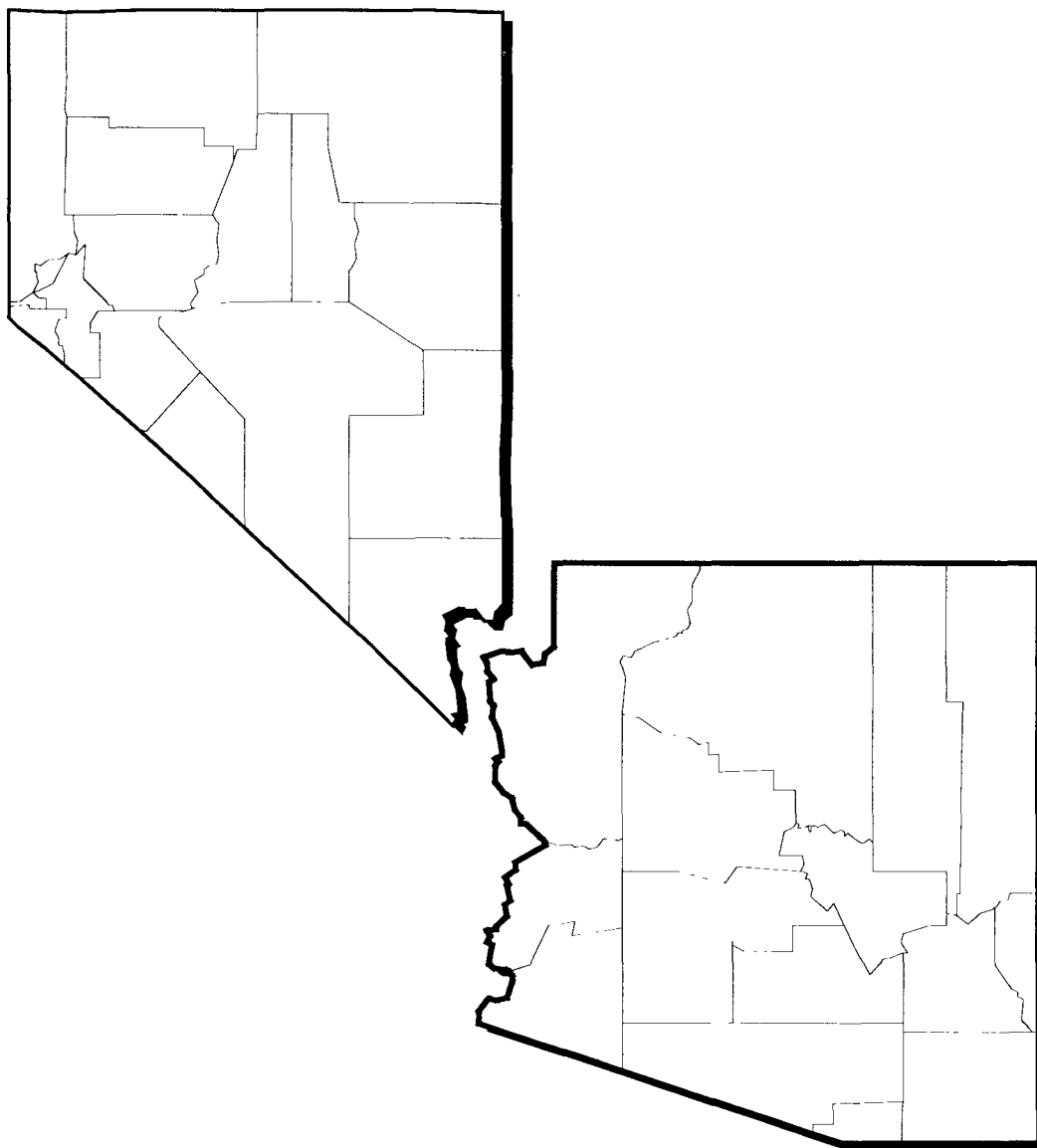
United States
Environmental Protection
Agency

Solid Waste And
Emergency Response
(5102 G)

EPA/540/R-93/003
December 1992
PB93-963204

SUPERFUND:

**Progress at
National
Priority
List Sites**



ARIZONA & NEVADA 1992 UPDATE



Printed on Recycled Paper

NATIONAL PRIORITIES LIST SITES:
Arizona and Nevada

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INTRODUCTION

A BRIEF OVERVIEW OF SUPERFUND

During the second half of the Twentieth Century, the environmental consequences of more than 100 years of industrialization in the United States became increasingly clear. Authors such as Rachel Carson wrote passionately about the often-hidden environmental effects of our modern society's widespread use of chemicals and other hazardous materials. Their audience was small at first, but gradually their message spread. Growing concern turned to action, as people learned more about the environment and began to act on their knowledge.

The 1970s saw environmental issues burst onto the national scene and take hold in the national consciousness. The first Earth Day was observed in 1970, the year that the U.S. Environmental Protection Agency (EPA) was founded. By the end of the 1970s, Love Canal in New York and the Valley of the Drums in



Kentucky had entered the popular lexicon as synonyms for pollution and environmental degradation.

Superfund Is Established

The industrialization that gave Americans the world's highest standard of living also created problems that only a national program could address. By 1980, the U.S. Congress had passed numerous environmental laws, implemented by the EPA, but many serious hazardous waste problems were slipping through the cracks.

Responding to growing concern about public health and environmental threats from uncontrolled releases of hazardous materials, the U.S. Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Popularly known as Superfund, CERCLA had one seemingly simple job—to uncover and clean up hazardous materials spills and contaminated sites.

A Big Job

Few in Congress, the EPA, the environmental community, or the general public knew in 1980 just how big the nation's hazardous materials problem is. Almost everyone thought that Superfund would be a short-lived program requiring relatively few resources to clean up at most a few hundred sites. They were quite mistaken.

As the EPA set to work finding sites and gauging their potential to harm people and the environment, the number of sites grew. Each discovery seemed to lead to another, and today almost 36,000 hazardous waste sites have been investigated as potential hazardous waste sites. They are catalogued in the EPA's computerized database, CERCLIS (for the Comprehensive Environmental Re-

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sponse, Compensation, and Liability Information System).

The damage to public health and the environment that each site in CERCLIS might cause is evaluated; many sites have been referred to State and local governments for cleanup. The EPA lists the nation's most serious hazardous waste sites on the National Priorities List, or NPL. (These Superfund sites are eligible for federally-funded cleanup, but whenever possible the EPA makes polluters pay for the contamination they helped create.) The NPL now numbers 1,275 sites, with 50 to 100 added each year. By the end of the century, the NPL may reach as many as 2,100 sites.

Superfund faces some of the most complex pollution problems ever encountered by an environmental program. Improperly stored or disposed chemicals and the soil they contaminate are one concern. More difficult to correct are the wetlands and bays, and the groundwater, lakes, and rivers often used for drinking water that are contaminated by chemicals spreading through the soil or mixing with

storm water runoff. Toxic vapors contaminate the air at some sites, threatening the health of people living and working near by.

Superfund aims to control immediate public health and environmental threats by tackling the worst problems at the worst sites first. Wherever possible, Superfund officials use innovative treatment techniques—many developed or refined by the EPA—to correct hazardous materials problems once and for all. Many of the treatment techniques they use did not exist when the program was created.

The EPA Administrator had challenged Superfund to complete construction necessary for cleanup work at 130 NPL sites by the end of the 1992 federal fiscal year. By September 30, 1992, the end of fiscal year 1992, construction had been completed at a total of 149 NPL sites. Superfund is well on its way of meeting the Administrator's goal of completing construction at 200 NPL sites by the end of fiscal year 1993, and 650 sites by the end of fiscal year 2000.

Quick Cleanup at Non-NPL Sites

Long-standing hazardous waste sites are not Superfund's only concern. The EPA also responds to hazardous spills and other emergencies, hauling away chemicals for proper treatment or disposal. Superfund teams perform or supervise responses at rail and motor vehicle accidents, fires, and other emergencies involving hazardous substances. They also evacuate people living and working near by, if necessary, and provide clean drinking water to people whose own water is contaminated. Removal crews also post warning signs and take other precautions to keep people and animals away from hazardous substances.



Superfund employee prepares equipment for groundwater treatment.

INTRODUCTION

Quick Cleanups, or Removals, are not limited to emergencies. When cleanup crews at contaminated sites find hazardous substances that immediately threaten people or the environment, they act right away to reduce the threat or to remove the chemicals outright. As the EPA implements the Superfund Accelerated Cleanup Model (SACM), more and more sites will undergo quick cleanups, and many of these will be cleaned up completely without ever being included on the NPL. (See "Streamlining Superfund: The Superfund Accelerated Cleanup Model.")

Some of Superfund's most significant gains in public health and environmental protection have been won by the removal program. As of March 31, 1992, the Emergency Response



Superfund employee removing drums from a Superfund site.

Program had logged more than 2,300 removal completions since Superfund was established.

The Public's Role

Superfund is unique among federal programs in its commitment to citizen participation. Although the EPA is responsible for determining how dangerous a site is and how best to clean it up, the Agency relies on citizen input as it makes these decisions.

Community residents are often invaluable sources of information about a hazardous waste site, its current and previous owners, and the activities that took place there. Such information can be crucial to experts evaluating a site and its potential dangers.

Residents also comment on EPA cleanup plans by stating their concerns and preferences at public meetings and other forums and in formal, written comments to Agency proposals. The EPA takes these comments and concerns seriously, and has modified many proposals in response to local concerns. For, ultimately, it is the community and its citizens that will live with the results of the EPA's decisions and actions; it is only fair that citizens participate in the process.

A Commitment to Communication

The Superfund program is very serious about public outreach and communication. Community relations coordinators are assigned to each NPL site to help the public understand the potential hazards present, as well as the cleanup alternatives. Local information repositories, such as libraries or other public buildings, have been established near each NPL site to ensure that the public has an opportunity to review all relevant information and the proposed cleanup plans.

The individual State volumes contain summary fact sheets on NPL sites in each State and territory. Together, the fact sheets provide a concise report on site conditions and the progress made toward site cleanups as of March 1992. The EPA revises these volumes periodically to provide an up-to-date record of program activities. A glossary of key terms relating to hazardous waste management and Superfund site cleanup is provided at the back of this book.

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Superfund is, of course, a public program, and as such it belongs to everyone of us. This volume, along with other State volumes, comprises the EPA's report on Superfund progress to the program's owners for the year 1992.

STREAMLINING SUPERFUND: THE SUPERFUND ACCELERATED CLEANUP MODEL

Historically, critics and supporters alike have measured Superfund's progress by the number of hazardous waste sites deleted from the NPL. Although easy enough to tally, this approach is too narrow. It misses the major gains Superfund makes by reducing major risks at the nation's worst hazardous sites long before all clean-up work is done and the site deleted. It also ignores the Removal Program's contributions to meeting Superfund's twin mandates of maximizing public health and environmental protection.

Renewing Superfund's commitment to rapid protection from hazardous materials, the EPA is streamlining the program. The Superfund Accelerated Cleanup Model, or SACM, will take Early Actions, such as removing hazardous wastes or contaminated materials, while experts study the site. SACM also will combine similar site studies to reduce the time required to evaluate a site and its threats to people and the environment. This way, immediate public health and environmental threats will be addressed while long-term cleanups are being planned.

Emergencies such as train derailments and motor vehicle accidents will continue to be handled expeditiously. Teams of highly trained technicians will swing into action right away, coordinating the cleanup and removal of hazardous substances to ensure public safety as quickly as possible.

Breaking With Tradition

The traditional Superfund process begins with a lengthy phase of study and site assessment, but SACM will save time by combining separate, yet similar, activities. Each EPA Region will form a Decision Team of site managers,

risk assessors, community relations coordinators, lawyers, and other experts to monitor the studies and quickly determine whether a site requires Early Action (taking less than five years), Long-term Action, or both.

While the site studies continue, the Decision Team will begin the short-term work required to correct immediate public health or environmental threats from the site. Besides removing hazardous materials, Early Actions include taking precautions to keep contaminants from moving off the site and restricting access to the site. Early Actions could eliminate most human risk from these sites, and Superfund will further focus its public participation and public information activities on site assessment and Early Action.

Long-Term Solutions

While Early Actions can correct many hazardous waste problems—and provide the bulk of public health and environmental protection—some contamination will take longer to correct. Cleanups of mining sites, wetlands, estuaries, and projects involving incineration of contaminants or restoration of groundwater can take far longer than the three to five years envisioned for Early Actions. Under SACM, these sites will be handled much as they are now.

Also under SACM, the EPA will continue its pursuit of potentially responsible parties who may have caused or contributed to site contamination. Expedited enforcement and procedures for negotiating potentially responsible party settlements will secure their participation. Superfund personnel will continue to oversee clean-up work performed by potentially responsible parties.

INTRODUCTION

HOW SUPERFUND WORKS

Each Superfund site presents a different set of complex problems. The same hazardous materials and chemicals often contaminate many sites, but the details of each site are different. Almost always, soil is contaminated with one or more chemicals. Their vapors may taint the air over and around the site. Contaminants may travel through the soil and reach underground aquifers which may be used for drinking water, or they may spread over the site to contaminate streams, ponds, and wetlands. The contaminating chemicals may interact with each other, presenting even more complicated cleanup problems.

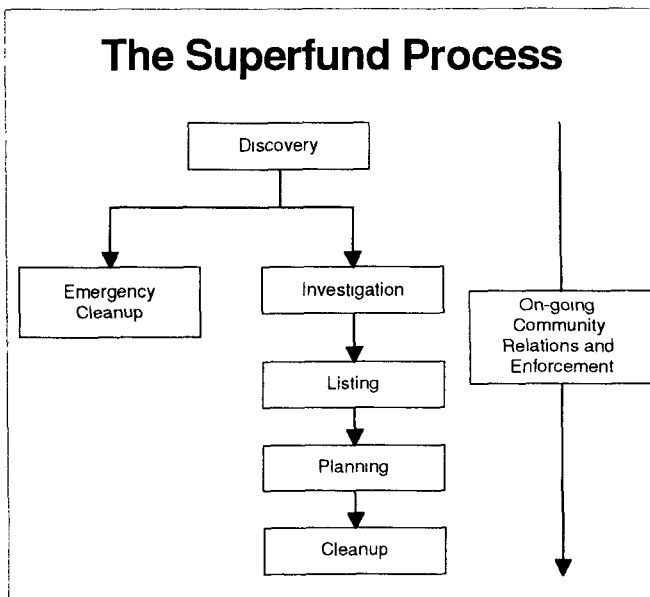
Superfund's cleanup process is arduous and exacting. It requires the best efforts of hundreds of experts in science and engineering, public health, administration and management, law, and many other fields.

The average NPL site takes from seven to ten years to work its way through the system, from discovery to the start of long-term cleanup. Actual cleanup work can take years, decades if contaminated groundwater must be treated. Of course, imminent threats to public health or the environment are corrected right away.

The diagram to the right presents a simplified view of the cleanup process. The major steps in the Superfund process are:

- Site discovery and investigation to identify contaminants and determine whether emergency action is required;
- Emergency site work such as removing contaminants for proper treatment or disposal, and securing the site to keep people and animals away, if warranted by conditions at the site;
- Site evaluation to determine how people living and working nearby, and the environment, may be exposed to site contaminants;

- Detailed studies to determine whether conditions are serious enough to add the site to the National Priorities List of sites eligible for federally funded cleanup under Superfund;
- Selection, design, and implementation of a cleanup plan, after a thorough review of the most effective cleanup options, given site conditions, contaminants present, and their potential threat to public health or the environment.
- Follow-up to ensure that the cleanup work done at the site continues to be effective over the long term.



From the earliest stages, EPA investigators work hard to identify those responsible for the contamination. As their responsibility is established, the EPA negotiates with these "responsible parties" to pay for cleaning up the problem they helped create. This "enforcement first" policy saves Superfund Trust Fund monies for use in cleanups where the responsible parties cannot be identified, or where they are unable to fund cleanup work.

THE VOLUME

How to Use the State Book

The site fact sheets presented in this book are comprehensive summaries that cover a broad range of information. The fact sheets describe hazardous waste sites on the NPL and their locations, as well as the conditions leading to their listing ("Site Description"). The summaries list the types of contaminants that have been discovered and related threats to public and ecological health ("Threats and Contaminants"). "Cleanup Approach" presents an overview of the cleanup activities completed, underway, or planned. The fact sheets conclude with a brief synopsis of how much progress has been made in protecting public health and the environment. The summaries also pinpoint other actions, such as

legal efforts to involve polluters responsible for site contamination and community concerns.

The fact sheets are arranged in alphabetical order by site name. Because site cleanup is a dynamic and gradual process, all site information is accurate as of the date shown on the bottom of each page. Progress always is being made at NPL sites, and the EPA periodically will update the site fact sheets to reflect recent actions and will publish updated State volumes. The following two pages show a generic fact sheet and briefly describe the information under each section.

How Can You Use This State Book?

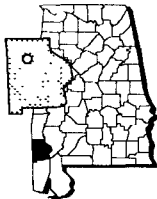

You can use this book to keep informed about the sites that concern you, particularly ones close to home. The EPA is committed to involving the public in the decision making process associated with hazardous waste cleanup. The Agency solicits input from area residents in communities affected by Superfund sites. Citizens are likely to be affected not only by hazardous site conditions, but also by the remedies that combat them. Site cleanups take many forms and can affect communities in different ways. Local traffic may be rerouted, residents may be relocated, temporary water supplies may be necessary.

Definitive information on a site can help citizens sift through alternatives and make decisions. To make good choices, you must know what the threats are and how the EPA

intends to clean up the site. You must understand the cleanup alternatives being proposed for site cleanup and how residents may be affected by each one. You also need to have some idea of how your community intends to use the site in the future, and you need to know what the community can realistically expect once the cleanup is complete.

The EPA wants to develop cleanup methods that meet community needs, but the Agency only can take local concerns into account if it understands what they are. Information must travel both ways in order for cleanups to be effective and satisfactory. Please take this opportunity to learn more, become involved, and assure that hazardous waste cleanup at "your" site considers your community's concerns.

THE VOLUME

SITE NAME STATE EPA ID# ABC0000000			EPA REGION XX COUNTY NAME LOCATION Other Names:
NPL LISTING HISTORY Provides the dates when the site was Proposed, made Final, and Deleted from the NPL.	Site Description	A	
	Site Responsibility:	NPL Listing History Proposed XX/XX/XX Final XX/XX/XX	
SITE RESPONSIBILITY Identifies the Federal, State, and/or potentially responsible parties taking responsibility for cleanup actions at the site.	Threats and Contaminants	B	
	Cleanup Approach	C	
ENVIRONMENTAL PROGRESS Summarizes the actions to reduce the threats to nearby residents and the surrounding environment and the progress towards cleaning up the site.	Response Action Status	D	
	Site Facts:	E	
	Environmental Progress		
Site Repository			
SITE REPOSITORY Lists the location of the primary site repository. The site repository may include community relations plans, public meeting announcements and minutes, fact sheets, press releases, and other site-related documents.			

A**SITE DESCRIPTION**

This section describes the location and history of the site. It includes descriptions of the most recent activities and past actions at the site that have contributed to the contamination. Population estimates, land usages, and nearby resources give readers background on the local setting surrounding the site.

B**THREATS AND CONTAMINANTS**

The major chemical categories of site contamination are noted, as well as which environmental resources are affected. Icons representing each of the affected resources (may include air, groundwater, surface water, soil, and contamination to environmentally sensitive areas) are included in the margins of this section. Potential threats to residents and the surrounding environments arising from the site contamination also are described.

C**CLEANUP APPROACH**

This section contains a brief overview of how the site is being cleaned up.

D**RESPONSE ACTION STATUS**

Specific actions that have been accomplished or will be undertaken to clean up the site are described here. Cleanup activities at NPL sites are divided into separate phases, depending on the complexity and required actions at the site. Two major types of cleanup activities often are described: initial, immediate, or emergency actions to quickly remove or reduce imminent threats to the community and surrounding areas; and long-term remedial phases directed at final cleanup at the site. Each stage of the cleanup strategy is presented in this section of the summary. Icons representing the stage of the cleanup process (initial actions, site investigations, EPA selection of the cleanup remedy, engineering design phase, cleanup activities underway, and completed cleanup) are located in the margin next to each activity description.

E**SITE FACTS**

Additional information on activities and events at the site are included in this section. Often details on legal or administrative actions taken by the EPA to achieve site cleanup or other facts pertaining to community involvement with the site cleanup process are reported here.

THE VOLUME

The “icons,” or symbols, accompanying the text allow the reader to see at a glance which environmental resources are affected and the status of cleanup activities at the site.

Icons in the Threats and Contaminants Section



Contaminated *Groundwater* resources in the vicinity or underlying the site. (Groundwater is often used as a drinking water source.)



Contaminated *Surface Water and Sediments* on or near the site. (These include lakes, ponds, streams, and rivers.)



Contaminated *Air* in the vicinity of the site. (Air pollution usually is periodic and involves contaminated dust particles or hazardous gas emissions.)



Contaminated *Soil and Sludges* on or near the site. (This contamination category may include bulk or other surface hazardous wastes found on the site.)



Threatened or contaminated *Environmentally Sensitive Areas* in the vicinity of the site. (Examples include wetlands and coastal areas or critical habitats.)

Icons in the Response Action Status Section



Initial, Immediate, or Emergency Actions have been taken or are underway to eliminate immediate threats at the site.



Site Studies at the site to determine the nature and extent of contamination are planned or underway.



Remedy Selected indicates that site investigations have been concluded, and the EPA has selected a final cleanup remedy for the site or part of the site.



Remedy Design means that engineers are preparing specifications and drawings for the selected cleanup technologies.

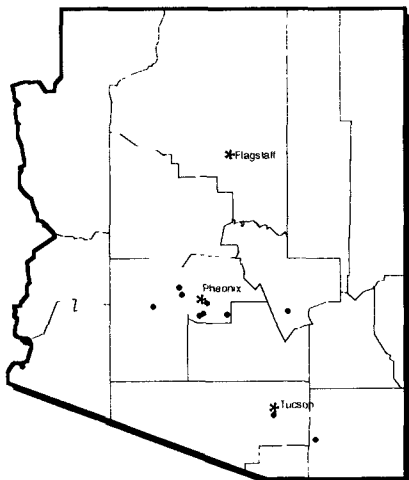


Cleanup Ongoing indicates that the selected cleanup remedies for the contaminated site, or part of the site, currently are underway.



Cleanup Complete shows that all cleanup goals have been achieved for the contaminated site or part of the site.

A SUMMARY OF THE STATE PROGRAM



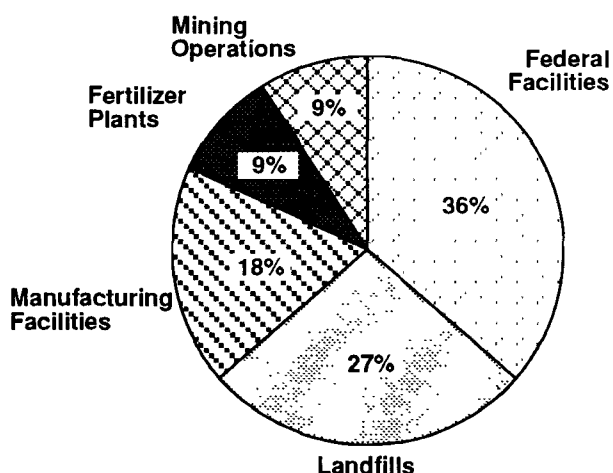
Superfund Activities in Arizona

The State of Arizona is located within EPA Region 9, which includes three southwestern States, Hawaii, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, and the Trust Territory of Pacific Islands. The State covers 114,000 square miles. According to the 1990 Census, Arizona experienced a 35 percent increase in population between 1980 and 1990, and is ranked twenty-fourth in U.S. population with approximately 3,665,228 residents.

The Arizona Environmental Quality Act of 1986, most recently amended in 1990, grants the State the authority to compel polluters to conduct or pay for cleanup activities at Superfund sites. The State can use its authority to make polluters liable for site cleanup, regardless of fault or actual contribution to the hazardous conditions of the site. The State must first demonstrate that parties are responsible for pollution before taking action against them. The State has the option of imposing civil penalties, serving injunctions, assessing damages of up to triple the amount, and recovering the cost of cleanup from polluters at a later time. In practice, the State encourages voluntary cleanup by polluters. Administrative and site activities are financed by the Water Quality Assurance Revolving Fund, which is funded by taxes, fees, penalties, and money recovered from polluters; this fund also provides the 10 percent contribution from the State required by the Federal Superfund program. To access these funds, however, the program must demonstrate that a site does or may impact State waters. Important site and program actions are announced in two State-wide newspapers. Public comment is required on the annual site priority list publication. Currently, 10 sites in the State of Arizona have been listed as final on the NPL; one has been deleted. No new sites have been proposed for listing in 1992.

The Department of Environmental Quality implements the Superfund Program in the State of Arizona

Activities responsible for hazardous waste contamination in the State of Arizona include:



Facts about the 11 NPL sites in Arizona:



Immediate Actions (such as removing hazardous substances or restricting site access) were performed at eight sites.



One site endangers sensitive environments.

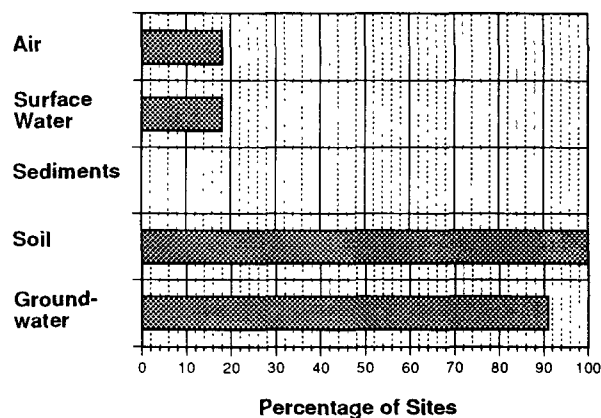


Nine sites are located near residential areas.

ARIZONA

Most Sites Have Multiple Contaminants and Contaminated Media:

Media Contaminated at Sites



Contaminants Found at Sites

Percentage of Sites	
VOCs	82%
Heavy Metals	73%
Other*	36%
Gases	27%
Pesticides/Herbicides	18%
PCBs	9%
Acids	9%
Asbestos	9%
Radiation	9%
Petrochemicals/Explosives	9%

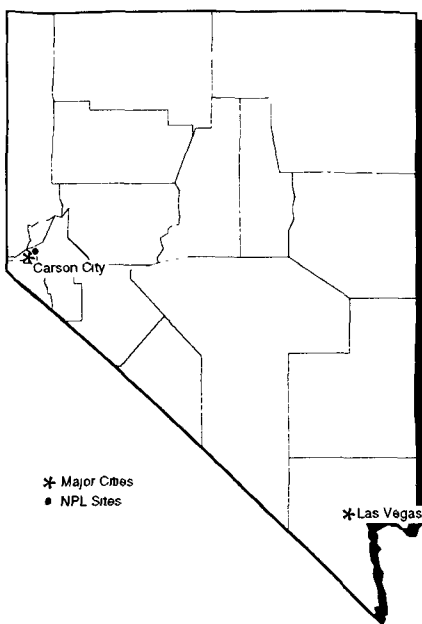
The Potentially Responsible Party Pays...

In the State of Arizona, potentially responsible parties are paying for or conducting cleanup activities at seven sites.

*Other contaminants include boron; chloroform; cyanide; lime wastes; nitrates; and residues from tear gas, ammunition, napalm, and paint.

For Further Information on NPL Sites and Hazardous Waste Programs in the State of Arizona Please Contact:

☎ EPA Region 9 Office of Public Affairs	For information concerning community involvement	(415) 744-1585
☎ National Response Center	To report a hazardous waste emergency	(800) 424-8802
☎ The Department of Environmental Quality: Remedial Projects Section	For information about the State's responsibility in the Superfund Program	(602) 207-4189
☎ EPA Region 9 Waste Management Division	For information about the Regional Superfund Program	(415) 744-1730
☎ EPA Superfund Hotline	For information about the Federal Superfund Program	(800) 424-9068



Superfund Activities in Nevada

The State of Nevada is located within EPA Region 9, which includes three southwestern States, Hawaii, American Samoa, Guam, the Commonwealth of the Northern Mariana Islands, and the Trust Territory of Pacific Islands. The State covers 110,561 square miles. According to the 1990 Census, Nevada experienced a 50 percent increase in population between 1980 and 1990, and is ranked thirty-ninth in U.S. population with approximately 1,202,000 residents.

The Nevada Revised Statutes of 1981, most recently amended in 1991, are commonly referred to as the "hazardous waste statutes." These statutes grant the State the authority to respond to hazardous waste spills, including the authority to make polluters who are involved in a spill liable for cleanup costs, regardless of fault. To compel polluters to comply, the State may issue subpoenas, serve injunctions, impose civil and criminal penalties, and recover costs at a later time if the State performs cleanup activities itself. The Hazardous Waste Management Fund, created by the 1981 Act, is earmarked for emergency response activities, site investigations, removals, long-term cleanup activities, and the 10 percent contribution from the State required by the Federal Superfund program. Sources of this fund are fees on waste generators and handlers, money recovered from polluters, penalties, and permit fees. Currently, one site in the State of Nevada has been listed as final on the NPL. No new sites have been proposed for listing in 1992.

The Department of Conservation and Natural Resources implements the Superfund Program in the State of Nevada

Activities responsible for hazardous waste contamination in the State of Nevada include:

Mining Operations—1 site or 100%

Facts about the NPL site in Nevada:



Immediate Actions (such as removing hazardous substances or restricting site access) were performed at this sites.



This site does not endanger sensitive environments.

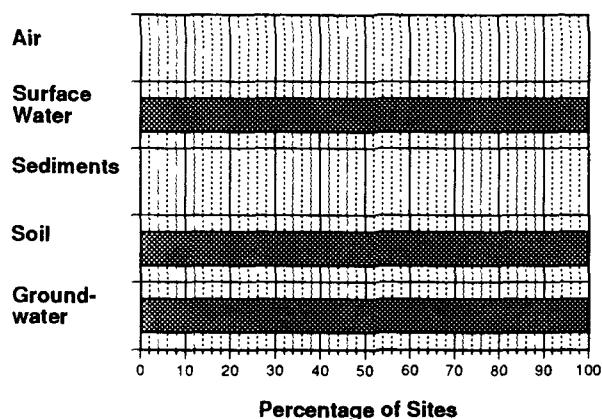


This site is located near residential areas.

NEVADA

Most Sites Have Multiple Contaminants and Contaminated Media:

Media Contaminated at Sites



Contaminants Found at Sites

Percentage of Sites	
Heavy Metals	100%

The Potentially Responsible Party Pays...

In the State of Nevada, no potentially responsible parties are paying for or conducting cleanup activities.

For Further Information on NPL Sites and Hazardous Waste Programs in the State of Texas Please Contact:

☎ EPA Region 9 Office of Public Affairs	For information concerning community involvement	(415) 744-1585
☎ National Response Center	To report a hazardous waste emergency	(800) 424-8802
☎ The Department of Conservation and Natural Resources: Division of Environmental Protection, Bureau of Waste Management, Superfund Branch	For information about the State's responsibility in the Superfund Program	(702) 687-5872
☎ EPA Region 9 Waste Management Division	For information about the Regional Superfund Program	(415) 744-1730
☎ EPA Superfund Hotline	For information about the Federal Superfund Program	(800) 424-9068

THE NPL REPORT

PROGRESS TO DATE

The following Progress Report lists all sites currently on, or deleted from, the NPL and briefly summarizes the status of activities for each site at the time this report was prepared. The steps in the Superfund cleanup process are arrayed across the top of the chart, and each site's progress through these steps is represented by an arrow (⇒) indicating the current stage of cleanup.

Large and complex sites often are organized into several cleanup stages. For example, separate cleanup efforts may be required to address the source of the contamination, hazardous substances in the groundwater, and surface water pollution, or to clean up different areas of a large site. In such cases, the chart portrays cleanup progress at the site's *most advanced* stage, reflecting the status of site activities rather than administrative accomplishments.

- ⇒ An arrow in the "Initial Response" category indicates that an emergency cleanup, immediate action, or initial action has been completed or currently is underway. Emergency or initial actions are taken as an interim measure to provide immediate relief from exposure to hazardous site conditions or to stabilize a site to prevent further contamination.
- ⇒ A final arrow in the "Site Studies" category indicates that an investigation to determine the nature and extent of the contamination at the site currently is ongoing or planned.
- ⇒ A final arrow in the "Remedy Selection" category means that the EPA has selected the final cleanup strategy for the site. At the few sites where the EPA has

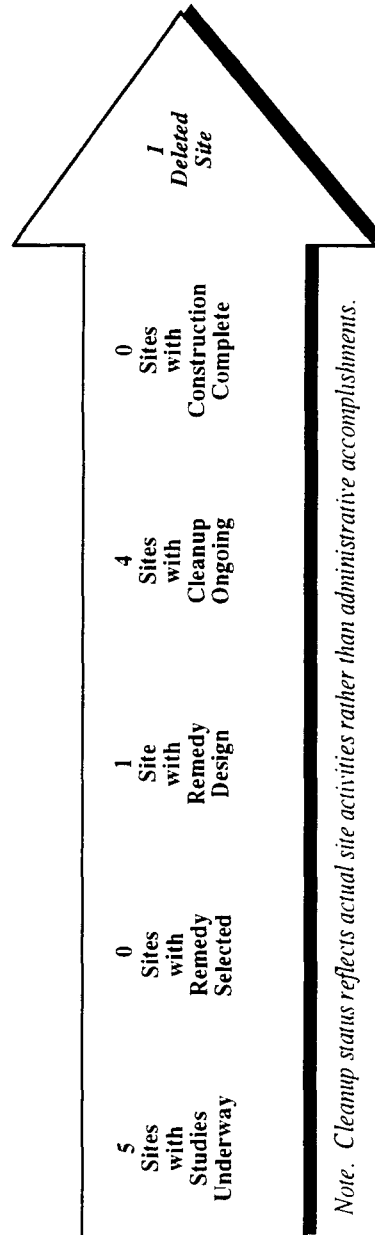
determined that initial response actions have eliminated site contamination, or that any remaining contamination will be naturally dispersed without further cleanup activities, a "No Action" remedy has been selected. In these cases, the arrows are discontinued at the "Remedy Selection" step and resume in the "Construction Complete" category.

- ⇒ A final arrow at the "Remedial Design" stage indicates that engineers currently are designing the technical specifications for the selected cleanup remedies and technologies.
- ⇒ A final arrow in the "Cleanup Ongoing" column means that final cleanup actions have been started at the site and currently are underway.
- ⇒ A final arrow in the "Construction Complete" category is used only when all phases of the site cleanup plan have been performed, and the EPA has determined that no additional construction actions are required at the site. Some sites in this category currently may be undergoing long-term operation and maintenance or monitoring to ensure that the cleanup actions continue to protect human health and the environment.
- ✓ A check in the "Deleted" category indicates that the site cleanup has met all human health and environmental goals and that the EPA has deleted the site from the NPL.

Further information on the activities and progress at each site is given in the site "Fact Sheets" published in this volume.

Progress Toward Cleanup at NPL Sites in the State of Arizona

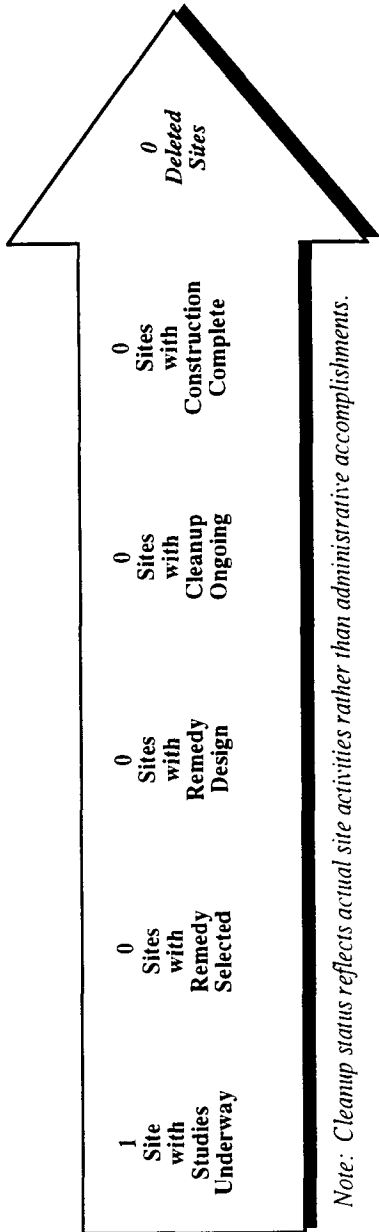
Site Name	County	NPL Date	Initial Response	Site Studies	Remedy Selected	Remedy Design	Cleanup Ongoing	Construction Complete	Deleted
APACHE POWDER COMPANY	COCHISE	Final 08/30/90	⇒	⇒					
HASSAYAMPA LANDFILL	MARICOPA	Final 07/22/87		⇒					
INDIAN BEND WASH AREA	MARICOPA	Final 09/01/83		⇒	⇒	⇒	⇒		
LITCHFIELD AIRPORT AREA	MARICOPA	Final 09/01/83	⇒	⇒	⇒	⇒	⇒		
LUKE AIR FORCE BASE	MARICOPA	Final 08/30/90	⇒	⇒					
MOTOROLA, INC. (52ND STREET PLANT)	MARICOPA	Final 10/04/89	⇒	⇒	⇒	⇒	⇒		
MOUNTAIN VIEW MOBILE HOMES	GILA	Deleted 04/18/88	⇒	⇒	⇒	⇒	⇒	⇒	✓
NINETEENTH AVENUE LANDFILL	MARICOPA	Final 09/01/83	⇒	⇒	⇒	⇒			
TUCSON INTL AIRPORT AREA	PIMA	Final 09/01/83	⇒	⇒	⇒	⇒	⇒		
WILLIAMS AIR FORCE BASE	MARICOPA	Final 11/21/89	⇒	⇒					
YUMA MARINE CORPS AIR STATION	YUMA	Final 02/22/90		⇒					



Note. Cleanup status reflects actual site activities rather than administrative accomplishments.

Progress Toward Cleanup at NPL Sites in the State of Nevada

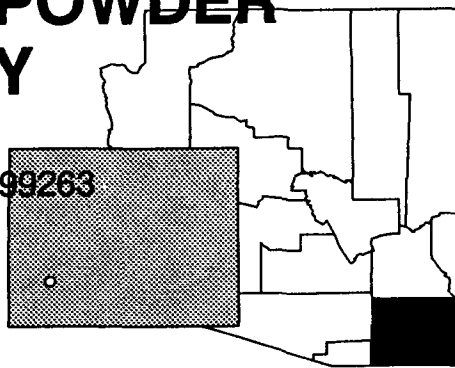
Site Name	County	NPL Date	Initial Response	Site Studies	Remedy Selected	Remedy Design	Cleanup Ongoing	Construction Complete	Deleted
CARSON RIVER MERCURY SITE	LYON/CHURCHILL	Final 08/30/90	⇒	⇒					



Note: Cleanup status reflects actual site activities rather than administrative accomplishments.

APACHE POWDER COMPANY ARIZONA

EPA ID# AZD008399263



EPA REGION 9

Cochise County
St. David

Other Names:
Apache Nitrogen Products, Inc.

Site Description

The Apache Powder Company has manufactured explosives and fertilizers on this 945-acre site since 1922. Prior to 1971, all wastewater was disposed of by flushing it into dry washes; the water then soaked into the ground or flowed into the San Pedro River. Since 1971, the company has been storing the wastewater in holding ponds. The water in these holding ponds contains high levels of nitrates, and the ponds may have leaked nitrates into the groundwater. In 1980, the EPA found high levels of heavy metals in one of the ponds. Ten shallow wells downgradient from the facility were found to contain nitrates. Approximately 1,100 people depend on wells for drinking water within 3 miles of the site. The nearest residence is less than 1/4 mile from the facility. Alfalfa is grown commercially within the vicinity of the site and is used as feed for cattle. Elevated levels of nitrates have been detected in the San Pedro River, which borders the site.

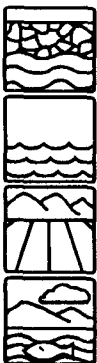
Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY

Proposed Date: 06/10/86

Final Date: 08/30/90

Threats and Contaminants



Groundwater and surface water contain nitrates, nitrites, and strontium. Soil and holding pond sludge contain nitrates, nitrites, lead, chromium, zinc, and strontium. People who ingest contaminated groundwater, surface water, soil, or sludges may be at risk. Wildlife in or around the San Pedro River may be harmed by contaminants leaking into the river.

Cleanup Approach

This site is being addressed in two stages: immediate actions and a long-term remedial phase focusing on cleanup of the entire site.

Response Action Status



Immediate Actions: In 1987, as a result of earlier water quality testing by the EPA, the Apache Powder Company began providing bottled water to area residents whose well water was found to be contaminated.



Entire Site: An investigation to determine the type and extent of contamination at the site is being conducted by the Apache Powder Company. Once the investigation is completed, scheduled for 1993, measures will be recommended for site cleanup. This investigation will include a study of the surface water pattern and sources, the location and hydrology of groundwater aquifers, and background levels of various chemicals and metals. The EPA is evaluating the collected data to assess the potential for public health and environmental threats.

Site Facts: In 1989, the Apache Powder Company entered into an Administrative Order, requiring Apache to conduct an investigation of site contamination.

Environmental Progress



The immediate action described above has provided a safe drinking water supply to affected residents and has eliminated the potential of exposure to contaminated drinking water. This initial action will continue to protect residents near the Apache Powder Company site until final cleanup activities are completed.

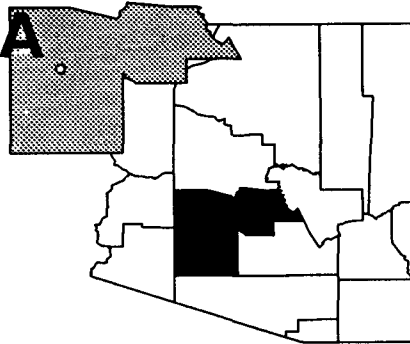
Site Repository



Benson Public Library, 300 South Huachuca, Benson, AZ 85602

HASSAYAMPA LANDFILL ARIZONA

EPA ID# AZD980735666



EPA REGION 9

Maricopa County
40 miles west of Phoenix

Site Description

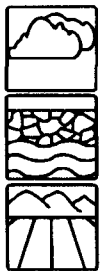
The 47-acre Hassayampa Landfill site has been used as a municipal landfill since 1961 and accepted approximately 3,000,000 gallons of liquid and 4,000 tons of solid hazardous waste. From 1979 to 1980, hazardous wastes were deposited in unlined trenches located in a 10-acre portion of the site. In 1981, the Arizona Department of Health Services (ADHS) installed three monitoring wells on site. Samples collected from these wells were found to be contaminated with volatile organic compounds (VOCs). Approximately 350 people draw drinking water from private wells, and 2,800 acres of farmland are irrigated by wells within 3 miles of the site. The distance to the nearest residence is approximately 1,000 yards south of the site. Hassayampa River, an intermittent stream, is 3/4 mile east of the landfill.

Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY

Proposed Date: 06/10/86
Final Date: 07/22/87

Threats and Contaminants



Ambient air contains very low levels of VOCs. Groundwater sampling results also have identified various VOCs. Soils beneath the waste pits contain VOCs, heavy metals, pesticides, and lime wastes. Risk assessment results indicate that potential health risks may exist for individuals who ingest the contaminated groundwater or for those who have direct contact with hazardous wastes present in several of the trenches. Currently, there does not appear to be any potential for adverse health effects due to inhalation of VOCs in the air. However, if contaminated groundwater is allowed to continue to migrate, there is the potential for excess cancer risk, primarily due to exposure to dichloroethene in groundwater.

Cleanup Approach

This site is being addressed in a long-term remedial phase focusing on cleanup of the entire site.

Response Action Status



Entire Site: Under EPA monitoring, the parties potentially responsible for the contamination initiated an investigation in 1988 to determine the type and extent of contamination at the site and to identify alternative technologies for the cleanup. The investigation and risk assessment were completed in 1991. A final cleanup remedy is expected to be selected in 1992, after the EPA has evaluated the recommended cleanup alternatives and the public comments.

Site Facts: In 1987, the EPA sent Special Notice Letters informing 108 individuals and companies of their potential responsibility for wastes contaminating the site. In February 1988, several potentially responsible parties entered into a Consent Order with the EPA in which they agreed to conduct the site investigation under EPA oversight. More than 50 other potentially responsible parties later contributed funds toward the completion of the investigation.

Environmental Progress



After adding this site to the NPL, the EPA performed preliminary investigations and determined that the Hassayampa Landfill site does not pose an immediate threat to public health or the environment. The EPA will review the results of the completed risk assessment to determine if interim cleanup actions are necessary to reduce the potential for exposure to hazardous waste sources at the site while cleanup activities are being planned.

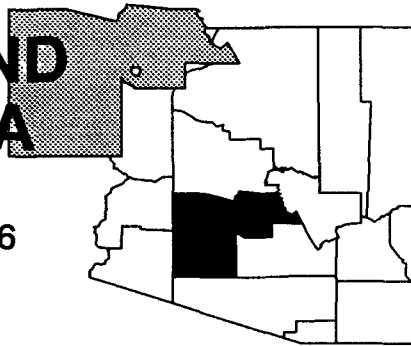
Site Repository



Buckeye Library, 310 North 6th Street, Buckeye, AZ 85326

INDIAN BEND WASH AREA ARIZONA

EPA ID# AZD98069596



EPA REGION 9

Maricopa County

Parts of Scottsdale, Tempe, and Phoenix,
and the Salt River Indian Reservation

Site Description

The Indian Bend Wash Area site is over 6 miles in length and covers 13 square miles. In 1981, the cities of Scottsdale and Phoenix discovered volatile organic compounds (VOCs) in seven municipal supply wells. These contaminants appear to have originated from several industrial facilities that operated in the northern portion of the Indian Bend Wash Area (NIBW); two of these facilities, Motorola and Beckman, are located upgradient from five municipal water wells. Six of seven contaminated wells were removed from service shortly after discovery; the seventh was equipped with a treatment service to remove VOCs, then was returned to full service. Some facilities at the southern portion of the Indian Bend Wash Area (SIBW) have discharged VOCs into the ground; other facilities may have discharged heavy metals, cyanides, and acids. Landfills at this area have received a variety of hazardous materials, including vinyl chloride and foundry slag. Approximately 70 percent of the City of Scottsdale's municipal water needs are supplied by groundwater. Approximately 130,000 people live in Scottsdale.

Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/01/83

Threats and Contaminants



Groundwater is contaminated with VOCs, boron, chloroform, lead, and zinc. Soil is contaminated with VOCs, cyanides, acids, and heavy metals including chromium and lead. Surface water also contains VOCs. People could be exposed to chemicals from the site if they accidentally ingest or come in direct contact with contaminated groundwater, soil, or surface water. Groundwater at the site is used to irrigate various crops and feed livestock. Contaminants could bioaccumulate in agricultural products that use contaminated groundwater.

Cleanup Approach

This site is being addressed in seven long-term remedial phases focusing on cleanup of: the Northern Indian Bend Wash Area, the Scottsdale Area, groundwater and soil contamination at the Southern Indian Bend Wash Area, the Beckman Industries Area, the Motorola Area, and the Siemens Area.

Response Action Status



Northern Indian Bend Wash Area: The EPA is addressing the NIBW as a separate area of study from SIBW, because the contaminants may come from a different source. An investigation into the extent and type of contamination was completed in 1991 and included recommendations on the best alternatives for cleaning up the site. The final cleanup remedy selected includes a soil vapor extraction system for contaminated soil and continued monitoring of the upper zone in the groundwater. Design of the remedy is expected to begin in late 1992.



Scottsdale Area: In 1988, the EPA selected a cleanup alternative, which included: containment of contaminants by extracting groundwater from the middle and lower parts of the aquifer and by pumping five City of Scottsdale wells and air stripping to clean the contaminated groundwater. The remedy includes granular activated carbon to extract the contaminants from the stream of air. In 1990, the potentially responsible parties installed wells that will be used to monitor the effectiveness of the cleanup process. The parties are scheduled to complete the design of the cleanup activities by 1992 and finish construction in 1994.



Southern Indian Bend Wash Groundwater Area: The EPA began a study of the nature and extent of groundwater contamination at SIBW in 1988. The EPA has ordered potentially responsible parties to install groundwater monitoring wells to assist with the groundwater investigation. Once completed, the study will recommend effective alternatives for final cleanup of the site. The investigation is expected to be completed in late 1993.



Beckman Industries Area: The EPA completed an investigation into the nature and extent of contamination at this area in 1991. Based on the results of the investigation, the final cleanup remedy selected is soil vapor extraction. The potentially responsible parties are expected to begin the design of the remedy in late 1992 and complete it by 1993.



Motorola Area: The potentially responsible parties completed an investigation of the extent of contamination at the area in 1991. The final cleanup remedy selected to address site contamination is soil vapor extraction. The design phase is expected to begin in late 1992, with cleanup activities scheduled to begin in late 1993.



Siemens Area: The potentially responsible parties began a study of the nature and extent of contamination at this area in 1989 and completed it in 1991. The remedy selected to address the cleanup of this area is soil vapor extraction. Plans to design the remedy are underway by the potentially responsible parties, with actual design scheduled to begin in late 1992.



Southern Indian Bend Wash/Soil Area: The EPA began a study of the nature and extent of soil contamination at SIBW in 1990. The investigation is expected to be completed in late 1993, at which time a final cleanup remedy will be selected.

Environmental Progress



After adding this site to the NPL, the EPA performed preliminary investigations and determined that no immediate actions were required at the Indian Bend Wash site while further studies are taking place and cleanup activities are being planned.

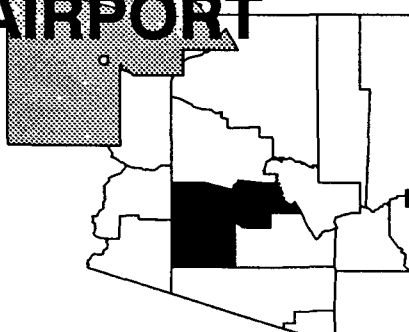
Site Repository



Scottsdale Public Library, Civic Center Library, 3839 Civic Center Boulevard,
Scottsdale, AZ 85251

LITCHFIELD AIRPORT AREA ARIZONA

EPA ID# AZD980695902



EPA REGION 9

Maricopa County
Goodyear

Other Names:

Phoenix-Goodyear Airport Area
Litchfield Airport Industrial Area
Phoenix-Litchfield Airport Area

Site Description

The Litchfield Airport Area is a 35-square-mile site that covers a portion of the City of Goodyear, including the present Phoenix-Goodyear Airport. In 1981, the Arizona Department of Health Services discovered contaminated groundwater near the airport. The State also found contaminated groundwater at Unidynamics, a facility located to the north of the airport. Soils were found to contain trichloroethylene (TCE) at both areas. The EPA sampled 89 wells in the area. Although 43 of these wells were found to contain TCE at levels that exceed Federal health standards, no water containing contaminants above these levels has been used in the municipal supply system since 1981. In 1989, the EPA concluded a study into the nature and extent of contamination at the site. The EPA conducted a joint study with the Arizona Department of Environmental Quality, the Arizona Department of Water Resources, Goodyear Tire & Rubber Company (Goodyear), the U.S. Department of Defense (DOD), and Unidynamics Phoenix, Inc. (Unidynamics). The combined population of Avondale and Goodyear is approximately 30,000 people.

Site Responsibility: This site is being addressed through Federal, State, and potentially responsible parties' actions.

NPL LISTING HISTORY

Proposed Date: 12/30/82
Final Date: 09/01/83

Threats and Contaminants



Groundwater and soil contain volatile organic compounds (VOCs) including TCE and chromium. The EPA concluded that, although TCE and other chemicals contaminate the groundwater in the vicinity of the site, the risk to people is minimal because the contaminated groundwater currently is not being used for drinking water. Although the cities of Goodyear and Avondale use groundwater for their drinking water supplies, their drinking water currently meets all State and Federal standards.

Cleanup Approach

This site is being addressed in five stages: initial actions and four long-term remedial phases that focus on cleanup of contamination that affects the entire site, cleanup of the Airport Treatment Plant/Section 16, cleanup of the Unidynamics area, and cleanup of the southern portion of the site.

Response Action Status



Initial Actions: In the southern portion of the site, the former chromium sludge drying bed will be cleaned up using solidification technology. It is scheduled to be completed in 1992. Solidifying the sludge bed will prevent migration of chromium into the groundwater and chromium dust particles into the air.



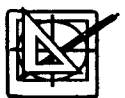
Entire Site: In 1989, the EPA selected two methods to address contamination at the site: pumping and treating contaminated groundwater through air stripping and vacuum extracting soil vapors, using carbon treatment to control emissions. The EPA began the design of these components in 1991. Cleanup of the site is scheduled to begin in late 1992.



Airport Treatment Plant/Section 16: In 1987, the EPA selected a cleanup strategy to control the movement and level of contaminants in the shallow groundwater directly below the site. Water from the shallow groundwater will be pumped from beneath a portion of the site where the highest levels of contaminants have been detected. The extracted water will be treated through air stripping and returned to the shallow groundwater system. Goodyear Tire and Rubber began to pump and treat the shallow groundwater under the site in 1989. In 1992, the expansion of the extraction and injection wells system was completed. This expansion increased the rate of shallow groundwater treatment by more than double.



Unidynamics: In 1989, the EPA selected a cleanup remedy that includes a soil vapor extraction system to treat contaminated soil and a groundwater pump and treat system. Unidynamics began to design the selected remedy in early 1991 and is scheduled to begin cleanup of the contamination at this area in late 1992. During the design of the soil vapor extraction system, studies indicated that the remedy addressing soil contamination may need to be modified.



Southern Portion: In 1989, the EPA selected a cleanup remedy to address contamination at this area that includes a soil vapor extraction system to treat contaminated soil and a pump and treat system decontaminating the deep groundwater. Contamination from the groundwater will be removed through air stripping devices. Engineering design of the remedies began in late 1991, with cleanup scheduled to begin in late 1992.

Site Facts: In 1988, the EPA, the DOD, and the Goodyear Tire & Rubber Company finalized an agreement, whereby Goodyear Tire will carry out cleanup activities for part of the shallow groundwater contaminated under the southern section of the site. In 1990, the EPA issued Unidynamics a Unilateral Administrative Order to design and implement all cleanup work required for the northern section of the site. In 1991, the EPA, Goodyear Tire & Rubber Co., Loral Defense Systems - Arizona, and the State of Arizona signed a Consent Decree, whereby Goodyear Tire will design and implement soil and deep groundwater cleanup activities. In 1992, the EPA, Goodyear Tire & Rubber Co., and Loral Defense Systems - Arizona signed a consent order, whereby Goodyear Tire will cleanup a chromium sludge drying bed.

Environmental Progress



A water treatment facility has been constructed and currently is in operation at the Litchfield Airport Area site to reduce contamination of the shallow groundwater. Remedies have been selected at the remaining portions of the site that, once underway, will address other contaminated groundwater resources and soils.

Site Repository

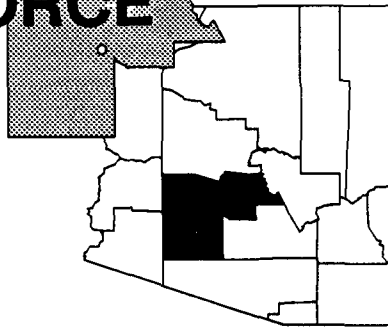


Contact the Region 9 Superfund Community Relations Office.

LUKE AIR FORCE BASE

ARIZONA

EPA ID# AZ0570024133



EPA REGION 9

Maricopa County
Glendale

Site Description

Construction of the 4,198-acre Luke Air Force Base (LAFB) site began in 1941, with the primary mission of providing advanced flight training to fighter pilots. Discharges and waste disposal practices at LAFB resulted in soil and possible groundwater contamination. Thirty-two areas of the base are subject to further investigation: two fire training areas; a waste oil and fuels underground storage tank area; three waste oil disposal trench areas; three surface drainage canals receiving oily wastes; a sewage treatment plant effluent canal; the site of an abandoned Defense Reutilization and Marking Office; thirteen land disposal sites (one of which contains a radiological disposal area); an old incinerator site; a former outside transformer storage site; two leaking underground storage tank sites; an abandoned surface impoundment; an ammunition storage area; a skeet range; and the base production wells. Contaminants on site include organic solvents and paint strippers, waste oil spills, petroleum spills, metal plating wastes, hydraulic fluids, and radiological wastes. There are approximately 4,900 military personnel and dependents living on base. Civilian and other military personnel who commute to the base daily from off base areas brings the total daily base population to approximately 8,000. The cities of Goodyear, Youngtown, and Phoenix depend on the water from the Phoenix groundwater, basin that underlies the site, for drinking water supplies.

Site Responsibility: This site is being addressed through Federal actions.

NPL LISTING HISTORY

Proposed Date: 07/14/89

Final Date: 08/30/90

Threats and Contaminants



Soil and possibly groundwater are contaminated with waste oils and volatile organic compounds (VOCs) resulting from the diverse processes that have taken place on the site. Potential human health hazards include accidental ingestion or direct contact with contaminated materials.

Cleanup Approach

This site is being addressed in three stages: initial actions and two long-term remedial phases focusing on cleanup of the entire site and soil contamination.

Response Action Status



Initial Actions: Completed initial cleanup actions include closing a former waste oil and contaminated fuel storage site, removing the tanks and capping the area with concrete, and installing monitoring wells. In 1990, soil around the Agua Fria River was stabilized by installing a grouted retaining wall. In addition, a vapor extraction system is being used to remove VOCs from soils in the North Fire Training Area.



Soil Contamination: An investigation into the soil contamination at the site began in 1990. At the conclusion of the investigation, scheduled for 1992, alternative recommendations will be made for cleanup of the site.



Entire Site: The EPA began oversight of the basewide investigation into the extent and type of contamination in 1990. At the conclusion of the investigation, alternative recommendations will be made for cleanup of the remaining contamination areas identified at the site.

Site Facts: The Luke Air Force Base site is participating in the Installation Restoration Program, a specially funded program established by the Department of Defense (DOD) in 1978 to identify, investigate, and control the migration of hazardous contaminants at military and other DOD facilities. A Federal Facilities Agreement to conduct the site cleanup plan was signed in September 1990. Under the terms of this Agreement, a basewide investigation and remedy selection is expected to be drafted by 1995.

Environmental Progress



Closing the waste oil and fuel storage site, removing tanks, capping the area, and installing monitoring wells have reduced the potential for exposure to hazardous materials at the Luke Air Force Base site while further studies and cleanup activities are being planned.

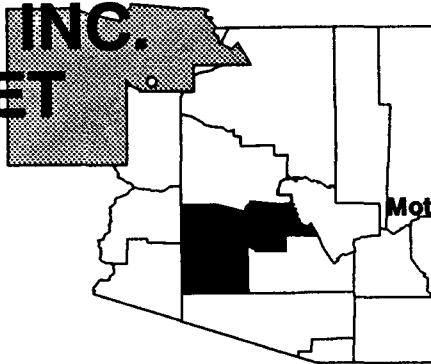
Site Repository



Not established.

MOTOROLA, INC. (52ND STREET PLANT) ARIZONA

EPA ID# AZD009004177



EPA REGION 9

Maricopa County
Phoenix

Other Names:

Motorola, Inc. Discrete Semiconductor

Site Description

Motorola, Inc. (52nd Street Plant) manufactures semiconductors and related components on this 90-acre site, using solvents in the production process. In 1983, Motorola tested some underground storage tanks for leaks. Results showed that one tank containing volatile organic compounds (VOCs) was leaking. Further investigations determined that on-site groundwater and soil as well as groundwater off site to the west were contaminated. Motorola detected contamination in monitoring wells at least a mile from the facility. Although the site lies in an area with drinking water provided by municipal water service, private wells have been identified around the site. Water for irrigation is provided by the Salt River Project. Approximately 500 residents live within 1 mile of this NPL site.

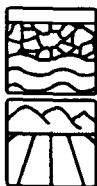
Site Responsibility: This site is being addressed through Federal, State, and potentially responsible parties' actions.

NPL LISTING HISTORY

Proposed Date: 10/15/84

Final Date: 10/04/89

Threats and Contaminants



Groundwater underlying the site, soil, and soil gas contain various VOCs from solvent use at the site. People who accidentally ingest or come into direct contact with contaminated groundwater and soil may be at risk.

Cleanup Approach

This site is being addressed in three stages: initial actions and two long-term remedial phases that both focus on cleanup of the contaminated groundwater plume.

Response Action Status



Initial Actions: Motorola has taken several interim actions to monitor and develop treatment remedies for contaminated groundwater. In 1983 and 1984, Motorola installed 22 on-site and six off-site monitoring wells. In 1986, additional monitoring wells were installed. The company also initiated an on-site groundwater treatment program that included treatability testing, design, and installation of a pilot treatment plant; treatment of groundwater; and use of the effluent in the plant's air fume scrubbers.



Groundwater Plume (First Action): In 1988, the EPA selected a remedy to clean a portion of the site by recovering the soil gas and groundwater and treating them in an on-site facility. On-site and off-site contaminated groundwater is being pumped and treated by carbon adsorption at the facility. The treated groundwater is then used in the manufacturing processes, replacing potable water supplied by the City of Phoenix. Currently, soil vapor extraction wells are being drilled and pipes to the soil vapor treatment facility are being laid.



Groundwater Plume (Second Action): Motorola, under State monitoring, is conducting an investigation of the remaining portion of the contaminant plume. Once this investigation is completed, scheduled for 1993, measures will be recommended for cleanup of the remaining groundwater plume contamination.

Environmental Progress



After adding this site to the NPL, the EPA performed preliminary investigations and determined that no other immediate actions, besides the initial treatment of groundwater by Motorola, were required at the Motorola, Inc. site while further studies are taking place and cleanup activities are underway.

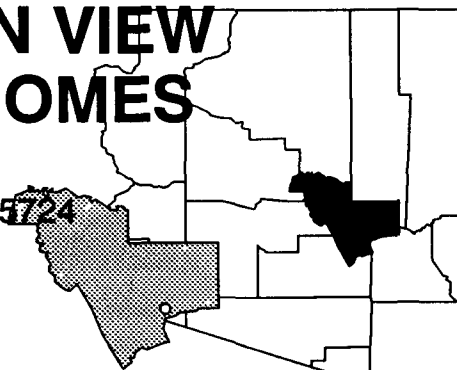
Site Repository



Contact the Region 9 Superfund Community Relations Office.

MOUNTAIN VIEW MOBILE HOMES ARIZONA

EPA ID# AZD980735724



EPA REGION 9

Gila County
2 miles from Globe

Other Names:
Globe Site

Site Description

The 17-acre Mountain View Mobile Homes site was developed in 1973 on the site of the former Metate Asbestos Corporation's chrysotile asbestos mill. In 1979, asbestos contamination of the site was discovered by local health officials inspecting the waste disposal system. Small piles of asbestos mill tailings were found against the abandoned mill structures and the adjacent railroad tracks. Before 1973, three mills in the area processed chrysotile asbestos ore from nearby mines. Because they failed to meet new EPA standards for emissions, two of the mills were ordered closed by the County in 1973. Before closing, however, the owner of one of the mill sites obtained a permit to rezone the property into a residential subdivision. Asbestos mill tailings were used as primary landfill material before the site was partially covered with topsoil. Before it shut down, this mill continued operations for several weeks while residents were moving into the mobile home community. The mill buildings and asbestos-laden equipment remained standing in the middle of the mobile homes. The third mill, with its large pile of asbestos mill tailings, continued to operate a few hundred yards from the mobile homes. Approximately 100 to 130 people lived in the mobile home park. The Town of Globe has a population of 8,000, and the adjacent Town of Miami has 3,000 residents.

Site Responsibility: This site was addressed through Federal and State actions.

NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/01/83

Deleted Date: 04/18/88

Threats and Contaminants



The air and soils on the site were shown to be contaminated with asbestos. Prior to site cleanup, area residents who came in direct contact with or accidentally ingested the asbestos-containing soil may have been at risk. In addition, inhaling asbestos fibers posed a potential for adverse health effects.

Cleanup Approach

This site was addressed in two stages: initial actions and a long-term remedial phase that focused on cleanup of the entire site.

Response Action Status



Initial Actions: In 1980, the State provided temporary housing for the residents while the site was being decontaminated. The old mill buildings were demolished, and topsoil was used to cover the contaminated soil. Wind, water, and public activity soon eroded the soil covering, which exposed the asbestos tailings again.



Entire Site: In 1983, the EPA selected a remedy to clean up the site by permanently relocating the mobile home residents; cleaning the site and demolishing and burying on site all the homes and sewage treatment plant; closing the site by covering it with either clay or a synthetic material, and placing clean soil on top of the site; fencing the area; and periodically inspecting and maintaining the site. Permanent relocation of all residents was completed in 1985, and ownership of the purchased property was transferred to the State. Following relocation of the residents, the site was cleaned up. The homes and other structures were crushed and buried on site in two natural depressions. Drainage culverts and enclosed pipes were installed to reduce the potential for erosion of the cover soils. A filter fabric was placed over the entire site to act as a physical barrier to upward movement of asbestos fibers and to prevent erosion. Clean soil was placed over the filter fabric, and compacted and crushed rock was added to complete the cover. The site was fenced to protect the integrity of the cover. The State has agreed to maintain the site for a minimum of 20 years. The EPA and the State have determined that the site is protective of public health and the environment and that no further cleanup is required. The site was deleted from the NPL in 1988. A five year review conducted in 1991 confirmed the effectiveness of the remedy and ensured the safety of the site.

Site Facts: The Metate Asbestos mill was ordered closed by the Gila County Air Quality Control District in 1973.

Environmental Progress



The numerous cleanup and relocation activities described above have eliminated the potential for exposure to asbestos-laden materials at the Mountain View Mobile Homes site. Area residents have been permanently relocated, and cleanup actions have successfully controlled site contamination. The EPA and the State have determined that the site is now safe for nearby residents and the environment and have deleted it from the NPL.

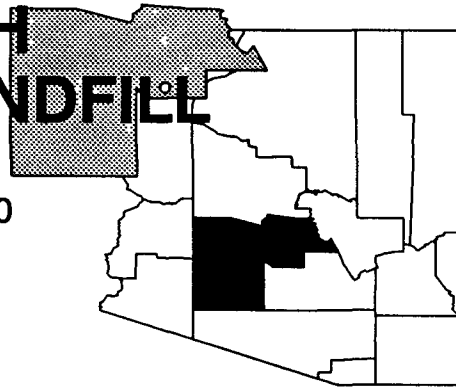
Site Repository



Information is no longer available.

NINETEENTH AVENUE LANDFILL ARIZONA

EPA ID# AZD980496780



EPA REGION 9

Maricopa County
Phoenix

Other Names:
Salt River Landfills

Site Description

The 213-acre Nineteenth Avenue Landfill site operated as a sanitary landfill between 1957 and 1979. One 200-acre portion of the site, Cell A, is located on the northern bank of the Salt River. A 13-acre portion of the landfill, Cell A-1, is located on the southern bank of the Salt River. In the past, sand and gravel companies excavated material along a 7-mile stretch of the Salt River. The City of Phoenix took over several of these pits for use as waste disposal sites. The Nineteenth Avenue Landfill accepted municipal, radioactive, hospital, and industrial wastes. Portions of the landfill are within the 100-year flood plain of the Salt River. Early in 1979, the river flooded, raising the water table and filling several pits. The high water also breached several dikes, opening landfill cells and causing refuse to wash into the river. Water also infiltrated directly into the cells, increasing the potential for leachate movement. Leachate is being generated from the site and is contaminating the groundwater. In addition, saturation of the waste has generated excess amounts of methane gas. The landfill was closed by the State in 1979. The population within 6 miles is approximately 6,000 people. The nearest residence is 1/3 mile from the site. The area's primary drinking water is provided by the City of Phoenix water distribution system. The municipal system draws water from surface water sources over 30 miles away. The nearest drinking water supply well is over 3 miles away. An industrial well and an agricultural well are located 200 feet and 800 feet from the site.

Site Responsibility: This site is being addressed through Federal and potentially responsible parties' actions.

NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/01/83

Threats and Contaminants



Groundwater contains volatile organic compounds (VOCs); heavy metals including arsenic, barium, mercury, and nickel; and beta radiation. Refuse in the landfill contains VOCs and pesticides. Soil contains VOCs, polychlorinated biphenyls (PCBs), and pesticides. The generation and migration of methane gas is a potential hazard. Methane may collect and reach explosive levels in enclosed buildings or other structures adjacent to the site. Soil, groundwater, and refuse are contaminated; however, the possibility of people being exposed to these contaminants is unlikely, since there are no residential areas within 1/4 mile of the site, and groundwater is not used for drinking water. Area residents and site workers who come in direct contact with or accidentally ingest the contaminated groundwater, soil, or refuse may suffer adverse health effects.

Cleanup Approach

This site is being addressed in two stages: immediate actions and a long-term remedial phase focusing on cleanup of the entire site.

Response Action Status



Immediate Actions: Earthen berms were constructed on the site to limit access. The site was covered with sand, gravel, and stones. In 1981, the City installed a system to collect methane gas and also installed monitoring wells to sample the groundwater.



Entire Site: In 1989, the EPA selected a remedy to clean up the landfill by: installing a gas collection and treatment system; covering the landfill with a clay soil cap to prevent water from coming into contact with the buried materials; and preventing erosion of the landfill by the construction of bank protection levees between the river and the landfill. In 1990, the City of Phoenix began designing the technical specifications to clean up the site. Once the design phase is completed, scheduled for 1994, cleanup activities will begin.

Environmental Progress



Methane control devices installed at the site have eliminated the potential for gas accumulation and explosion at the site. The construction of berms, covering of the site, and the installation of monitoring wells have reduced the potential for exposure to contaminated materials while final cleanup remedies are being designed at the Nineteenth Avenue Landfill site.

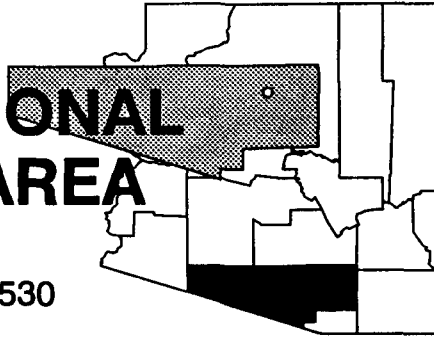
Site Repository



Ocotillo Branch Public Library, 102 West Southern Avenue, Phoenix, AZ 85041

TUCSON INTERNATIONAL AIRPORT AREA ARIZONA

EPA ID# AZD980737530



EPA REGION 9

Pima County
Tucson

Other Names:
Hughes Aircraft Company
USAF Plant 44

Site Description

The 24-square-mile Tucson International Airport Area (TIAA) site includes the Tucson International Airport, portions of the San Xavier Indian Reservation, residential areas of the Cities of Tucson and South Tucson, and the Air Force Plant #44/Hughes Aircraft Company facility. At least 20 facilities have operated in the TIAA area since 1942, including aircraft and electronics facilities, which discharged waste liquids directly into the soil; fire drill training areas, where wastes from training operations were left in unlined pits; and unlined landfills, which received various wastes from several sources. The first indications of groundwater contamination at TIAA appeared in the early 1950s, when elevated levels of chromium were detected in a municipal supply well adjacent to the U.S. Air Force Plant #44. The U.S. Air Force Plant #44, which has been operated under contract by the Hughes Aircraft Company (HAC) since 1951, is believed to be a major contributor to groundwater contamination. The facility used trichloroethylene (TCE) as a metal degreaser and chromium in electroplating. Wastewater and spent solvents were discharged into unlined ditches or disposed of in waste pits and ponds. Surface water flowed off HAC property and onto the San Xavier Reservation. Beginning in 1976, lined wastewater holding ponds were constructed to receive wastewater discharges. The State also closed a well at the plant because of high levels of chromium. A second source of contamination at the TIAA site is believed to be the Tucson Airport Hangar Area, which was occupied by various defense contractors from 1942 to 1958. During this period, volatile organic compounds (VOCs) were used and disposed of on site and in the airport landfill. Other more recent occupants of the hangar also may have contributed to the groundwater contamination. Sources of contamination at the northern and eastern edges of the airport are believed to be the Arizona Air National Guard, the Burr-Brown Corporation, and West-Cap Arizona. The localized groundwater contamination due to these operations is situated east of the main contaminant plume. The City of Tucson is dependent on groundwater for its water supply. Before the discovery of groundwater contamination, wells within the site boundaries provided water for over 47,000 people. The Santa Cruz River borders the site.

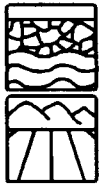
Site Responsibility: This site is being addressed through Federal, State, and potentially responsible parties' actions.

NPL LISTING HISTORY

Proposed Date: 12/30/82

Final Date: 09/01/83

Threats and Contaminants



Groundwater underlying the site and soil contain VOCs and chromium. People who come in direct contact with or accidentally ingest contaminated groundwater and soil may be at risk.

Cleanup Approach

This site is being addressed in three stages: immediate actions and two long-term remedial phases focusing on cleanup of groundwater and soils.

Response Action Status



Immediate Actions: In 1981, the City of Tucson began closing all municipal wells that exceeded the State levels and notified private well users of potential risks. Since 1987, the Air Force has been extracting and treating groundwater in the southern portion of the site. By 1987, 35 lined wastewater holding ponds had been constructed to receive process wastewater. In 1991, sludges from a concrete sump were removed.



Groundwater: In 1988, the EPA selected a remedy to treat the groundwater in the northern portion of the site by pumping and treating the contaminated groundwater, using packed column aeration (air stripping), followed by discharging the treated water to the municipal water distribution system and treating the emissions from the treatment process using granular activated carbon. The remedy applies to three areas of groundwater contamination in the northern portion of the site: a large area called "Area A," west of the airport, and two smaller areas, together referred to as "Area B," north of the airport. Burr-Brown Corporation is addressing contamination cleanup in the easternmost section of Area B and the Arizona Air National Guard is addressing the contamination cleanup in the westernmost section. Burr-Brown Corporation completed its design of the groundwater extraction and treatment system in Area B in 1991 and began cleanup activities soon thereafter. The other potentially responsible parties, under EPA monitoring, are designing the technical specifications for the groundwater pump and treat system for the remaining two areas of site contamination. Once these design phases are completed, scheduled for 1993, the remaining cleanup activities will begin.



Soils: In 1990, the potentially responsible parties, under EPA monitoring, began an investigation to determine the type and extent of soil contamination on airport property. This investigation is expected to be completed in 1994, at which time measures will be recommended for soil cleanup.

Site Facts: In 1989, the EPA issued an Administrative Order to the parties potentially responsible for site contamination requiring them to clean up the groundwater and soil. In March 1990, a Consent Decree was signed between the EPA and Burr-Brown Corporation requiring Burr-Brown Corporation to clean up the easternmost part of Area B. In June 1991, a Consent Decree was approved for the cleanup of Area A by the potentially responsible parties.

Environmental Progress



Contaminated drinking supplies have been removed from service, and initial actions have been taken to control further contamination at the site by treating contaminated groundwater and remaining sludges from a concrete sump. Additional cleanup remedies currently are being designed or planned that will address remaining contamination areas and will restore the site to safety levels.

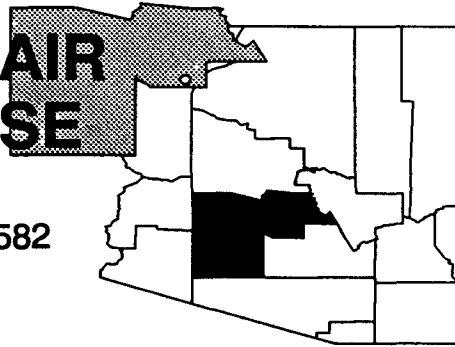
Site Repository



City of Tucson Main Library, Government Reference Section, 101 North Stone Street,
Tucson, AZ 85701

WILLIAMS AIR FORCE BASE ARIZONA

EPA ID# AZ7570028582



EPA REGION 9

Maricopa County
Chandler

Site Description

The 4,127-acre Williams Air Force Base (WAFB) site was commissioned as a flight training school in 1941. The Air Force Base is scheduled to be closed in September, 1993. Contaminants from base activities include organic solvents and paint strippers, petroleum spills, metal plating wastes, hydraulic fluids, pesticides, and radiological wastes. Discharges and disposal at WAFB have resulted in soil and groundwater contamination. Thirteen subsites have been identified as potentially contaminated areas including two fire training areas, a fuel storage area, two surface storm drainage areas, a hazardous material storage area, a landfill, a pesticide burial pit, a radiological disposal area, and four underground storage tanks. In 1992, several new subsites were discovered at the Base which will be added to the investigation. Approximately 3,000 military personnel are stationed at WAFB, as well as 860 civilian employees. Many of the military personnel live off base in one of the surrounding towns. The total population living on base, including dependents, is approximately 2,700. On an average workday, the population of the base rises to over 5,000.

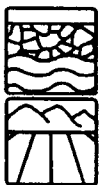
Site Responsibility: This site is being addressed through Federal actions.

NPL LISTING HISTORY

Proposed Date: 07/14/89

Final Date: 11/21/89

Threats and Contaminants



Groundwater contains volatile organic compounds (VOCs), and nitrates. Heavy metals including lead, cadmium, nickel, and chromium have also been detected in groundwater, but need to be confirmed. Soils also contain various VOCs from past disposal practices. Accidental ingestion of contaminated soil and groundwater are potential health hazards.

Cleanup Approach

This site is being addressed in three stages: initial actions and two long-term remedial phases focusing on cleanup of the entire site and the Liquid Fuels Storage Area.

Response Action Status



Initial Actions: A portion of the Southwest Drainage System was stabilized in 1988 by installing a soil cement and concrete cap on the ditch. In 1991, a small pesticide drum burial site was excavated and disposed of off site. Radiological materials are expected to be removed from another burial site and disposed of in late 1992. The removal of approximately 20 underground storage tanks at the liquid fuels storage area was conducted during late 1990 and early 1991, eliminating the source for liquid fuel leaks.



Entire Site: The EPA began oversight of the Air Force's investigation at the site that will determine the nature and extent of the contamination at all impacted areas of the base. The results of the investigation are expected in early 1994 and will be used to evaluate different cleanup methods.



Liquid Storage Area: In 1990, an investigation into the type and extent of contamination was initiated at the waste liquids storage area. At the conclusion of the investigation, scheduled for late 1992, alternative recommendations for cleanup of the area will be presented and evaluated to select a final cleanup strategy.

Site Facts: Williams Air Force Base is participating in the Installation Restoration Program, a specially funded program established by the Department of Defense (DOD) in 1978 to identify, investigate, and control the migration of hazardous contaminants at military and other DOD facilities.

Environmental Progress



Cleaning the Southwest Drainage System, and removing pesticide drums and underground storage tanks have reduced the potential for exposure to contaminated materials at the Williams Air Force Base site while studies are taking place and cleanup activities are being planned.

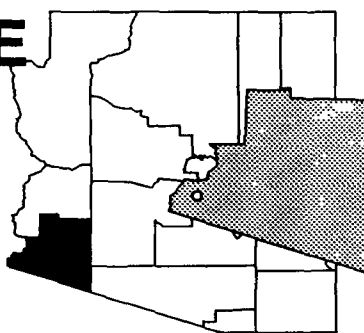
Site Repository



Chandler Public Library, 75 East Commonwealth, Chandler, AZ 85225

YUMA MARINE CORPS AIR STATION ARIZONA

EPA ID# AZ0971590062



EPA REGION 9

Yuma County
2 miles from Yuma

Site Description

Since the mid-1950s, large volumes of waste fuels and solvents from refueling and servicing of airplanes have been disposed of directly onto the ground or into unlined pits at the 3,000-acre Yuma Marine Corps Air Station site. In addition, combustible materials such as fuel oil and organic solvents have been deposited on the ground and burned during fire training exercises. The Navy has identified volatile organic compounds (VOCs) in soil at the site. Approximately 5,700 people live on site and usually obtain their drinking water from the Colorado River through an irrigation canal. However, during maintenance work on the canal that lasts for two weeks each year, drinking water comes from an on-station well. An additional 3,300 base employees use water from this well. The City of Yuma is 2 miles from the site, with a summer population of 60,000 and a winter population of 180,000. Groundwater supplies agricultural and industrial users. The city does not use groundwater for drinking water purposes.

Site Responsibility: This site is being addressed through Federal actions.

NPL LISTING HISTORY

Proposed Date: 06/24/88

Final Date: 02/22/90

Threats and Contaminants



Groundwater and soils on the site contain various VOCs and other contaminants including residues from tear gas, ammunition, napalm, paints, and photographic processing chemicals. The contaminated soil could pose a health hazard to individuals if it is directly contacted or accidentally ingested. The Colorado River, which runs close to the site, could become polluted from the site contaminants.

Cleanup Approach

This site is being addressed in two long-term remedial phases focusing on cleanup of the entire site and the groundwater.

Response Action Status



Entire Site: The Marine Corps began an investigation in 1991 to evaluate the nature and extent of the site contamination. The results of the study will be used to evaluate different cleanup alternatives and to select the preferred method for long-term protection of human health and the environment.



Groundwater: In 1991, the Marine Corps began investigating the surface and subsurface landfill areas of contamination that may be sources of groundwater contamination. Once the investigation is completed, alternative cleanup options will be identified.

Site Facts: Yuma Marine Corps Air Station is participating in the Installation Restoration Program, a specially funded program established by the Department of Defense (DOD) in 1978 to identify, investigate, and control the migration of hazardous contaminants at military and other DOD facilities. In January 1992, the EPA entered into a Federal Facility Agreement with the Marine Corps Air Station Yuma to initiate site investigations.

Environmental Progress



After adding this site to the NPL, the EPA performed preliminary investigations and determined that no immediate actions were required at the Yuma Marine Corps Air Station site while further studies and cleanup activities are being planned.

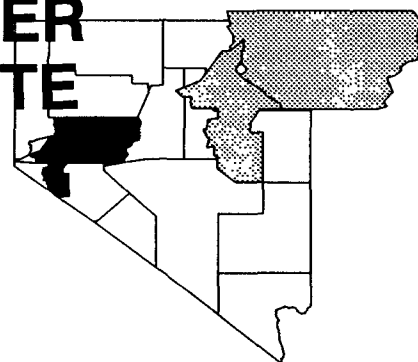
Site Repository



Not established.

CARSON RIVER MERCURY SITE NEVADA

EPA ID# NVD980813646



EPA REGION 9
Lyon and Churchill Counties

Site Description

The Carson River Mercury Site consists of a 50-mile stretch of the Carson River, beginning between Carson City and Dayton and extending downstream through the Lahontan Reservoir, which has been contaminated by mercury used in the amalgamation of gold and silver. In the late 1800s, large amounts of mercury were used during the milling of the Comstock Lode near Virginia City. Ore mined from the lode was transported to mill sites, where it was crushed and mixed with mercury to amalgamate the precious metals. Of the original 75 sites, 12 sites along the Carson River in the Brunswick Canyon area frequently were used because of the availability of water power. Mercury mine tailings, resulting from the mill site operations, have been found 5 miles up Brunswick Canyon, 3 miles up Six Mile Canyon, and within the Carson Plains. Areas near the Comstock Lode where extensive mining occurred, such as Gold Canyon, also may be major sources of mercury-contaminated mine tailing piles. Annual rains transport mercury from the tailings piles in the canyons to the Carson River, where the Nevada Division of Environmental Protection (NDEP) has documented extensive mercury contamination. The NDEP sampled the water and sediments from the Carson River and found elevated levels of mercury attributed to the tailings piles in various areas of the Carson River. Approximately 1,400 people obtain drinking water from wells within 3 miles from the site, the nearest being within 2,000 feet of the site.

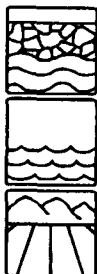
Site Responsibility: This site is being addressed through Federal and State actions.

NPL LISTING HISTORY

Proposed Date: 10/04/89

Final Date: 08/30/90

Threats and Contaminants



Groundwater, surface water, sediments, and soils at site areas are contaminated with mercury. Possible health threats include direct contact with or accidental ingestion of the contaminants. Additionally, runoff from contaminated site areas may facilitate the spread of contamination to other unaffected environments.

Cleanup Approach

This site is being addressed in two stages: initial actions and a long-term remedial phase focusing on cleanup of the entire site.

Response Action Status



Initial Actions: In 1991, seven tailings piles containing mercury-contaminated dust were excavated and removed from the site. Concerns over possible exposure of vehicle users to contaminated materials prompted this removal. The EPA also removed two mercury-contaminated tailings piles in the Dayton area to eliminate health risks posed to children who play in the area. All contaminated materials were transported to a mineral resource recovery facility.



Entire Site: The EPA began conducting an investigation into the nature and extent of contamination at the site in 1990. A final remedy to clean up the site will be selected, based on the results of the investigation, scheduled for completion in late 1994.

Environmental Progress



Excavation and removal of contaminated tailings piles from the Carson River Mercury Site have reduced the potential of exposure to contaminated dust while further studies are taking place and cleanup actions are being planned.

Site Repository



Ormsby Public Library, 900 North Roop Street, Carson City, NV 89701

GLOSSARY

Terms Used in the NPL Book

This glossary defines terms used throughout the NPL Volumes. The terms and abbreviations contained in this glossary apply specifically to work performed under the Superfund program in the context of hazardous waste management. These terms may have other meanings when used in a different context. A table of common toxic chemicals found at NPL sites, their sources, and their potential threats is located on page G-15

Acids: Substances, characterized by low pH (less than 7.0), that are used in chemical manufacturing. Acids in high concentration can be very corrosive and react with many inorganic and organic substances. These reactions possibly may create toxic compounds or release heavy metal contaminants that remain in the environment long after the acid is neutralized.

Administrative Order On Consent: A legal and enforceable agreement between the EPA and the parties potentially responsible for site contamination. Under the terms of the Order, the potentially responsible parties (PRPs) agree to perform or pay for site studies or cleanups. It also describes the oversight rules, responsibilities, and enforcement options that the government may exercise in the event of non-compliance by potentially responsible parties. This Order is signed by PRPs and the government; it does not require approval by a judge.

Administrative Order [Unilateral]: A legally binding document issued by the EPA, directing the parties potentially responsible to perform site cleanups or studies (generally, the EPA does not issue Unilateral Orders for site studies). This type of Order is not signed by the PRPs and does not require approval by a judge.

Aeration: A process that promotes breakdown of contaminants in soil or water by exposing them to air.

Agency for Toxic Substances and Disease Registry (ATSDR): The Federal agency within the U.S. Public Health Service charged with carrying out the health-related responsibilities of CERCLA.

Air Stripping: A process whereby volatile organic chemicals (VOCs) are removed from contaminated material by forcing a stream of air through the contaminated material in a pressurized vessel. The contaminants are evaporated into the air stream. The air may be further treated before it is released into the atmosphere.

Ambient Air: Any unconfined part of the atmosphere. Refers to the air that may be inhaled by workers or residents in the vicinity of contaminated air sources.

Applicable or Relevant and Appropriate Requirements (ARARs): Federal, State, or local laws which apply to Superfund activities at NPL sites. Both emergency and long-term actions must comply with these laws or provide sound reasons for allowing a waiver. ARARs must be identified for each site relative to the characteristics of the site, the substances found at the site, or the cleanup alternatives being considered for the site.

GLOSSARY

Aquifer: An underground layer of rock, sand, or gravel capable of storing water within cracks and pore spaces, or between grains. When water contained within an aquifer is of sufficient quantity and quality, it can be tapped and used for drinking or other purposes. The water contained in the aquifer is called groundwater. A "sole source aquifer" supplies 50 percent or more of the drinking water of an area.

Artesian (Well): A well made by drilling into the earth until water is reached, which, due to internal pressure, flows up like a fountain.

Asbestos: A mineral fiber that can pollute air or water and is known to cause cancer or asbestosis when inhaled.

Attenuation: The naturally occurring process by which a compound is reduced in concentration over time through adsorption, degradation, dilution, or transformation.

Background Level: The amount of a substance typically found in the air, water, or soil from natural, as opposed to human, sources.

Baghouse Dust: Dust accumulated in removing particulates from the air by passing it through cloth bags in an enclosure.

Bases: Substances characterized by high pH (greater than 7.0), which tend to be corrosive in chemical reactions. When bases are mixed with acids, they neutralize each other, forming salts.

Berm: A ledge, wall, or a mound of earth used to prevent the migration of contaminants.

Bioaccumulate: The process by which some contaminants or toxic chemicals gradually collect and increase in concentration in living tissue, such as in plants, fish, or people, as they breathe contaminated air, drink contaminated water, or eat contaminated food.

Biological Treatment: The use of bacteria or other microbial organisms to break down toxic organic materials into carbon dioxide and water.

Bioremediation: A cleanup process using naturally occurring or specially cultivated microorganisms to digest contaminants and break them down into non-hazardous components.

Bog: A type of wetland that is covered with peat moss deposits. Bogs depend primarily on moisture from the air for their water source, are usually acidic, and are rich in plant residue [see Wetland].

Boom: A floating device used to contain oil floating on a body of water or to restrict the potential overflow of waste liquids from containment structures.

Borehole: A hole that is drilled into the ground and used to sample soil or ground-water.

Borrow Pit: An excavated area where soil, sand, or gravel has been dug up for use elsewhere.

Cap: A layer of material, such as clay or a synthetic material, used to prevent rainwater from penetrating and spreading contaminated materials. The surface of the cap generally is mounded or sloped so water will drain off.

Carbon Adsorption: A treatment system in which contaminants are removed from ground-water and surface water by forcing water through tanks containing activated carbon, a specially treated material that attracts and holds or retains contaminants.

Carbon Disulfide: A degreasing agent formerly used extensively for parts washing. This compound has both inorganic and organic

properties, which increase cleaning efficiency. However, these properties also cause chemical reactions that increase the hazard to human health and the environment.

Carbon Treatment: [see Carbon Adsorption].

Cell: In solid waste disposal, one of a series of holes in a landfill where waste is dumped, compacted, and covered with layers of dirt.

CERCLA: [see Comprehensive Environmental Response, Compensation, and Liability Act].

Characterization: The sampling, monitoring, and analysis of a site to determine the extent and nature of toxic releases. Characterization provides the basis for acquiring the necessary technical information to develop, screen, analyze, and select appropriate cleanup techniques.

Chemical Fixation: The use of chemicals to bind contaminants, thereby reducing the potential for leaching or other movement.

Chromated Copper Arsenate: An insecticide/herbicide formed from salts of three toxic metals: copper, chromium, and arsenic. This salt is used extensively as a wood preservative in pressure-treating operations. It is highly toxic and water-soluble, making it a relatively mobile contaminant in the environment.

Cleanup: Actions taken to eliminate a release or threat of release of a hazardous substance. The term "cleanup" sometimes is used interchangeably with the terms remedial action, removal action, response action, or corrective action.

Closure: The process by which a landfill stops accepting wastes and is shut down under Federal

guidelines that ensure the protection of the public and the environment.

Comment Period: A specific interval during which the public can review and comment on various documents and EPA actions related to site cleanup. For example, a comment period is provided when the EPA proposes to add sites to the NPL. Also, there is minimum 3-week comment period for community members to review and comment on the remedy proposed to clean up a site.

Community Relations: The EPA effort to establish and maintain two-way communication with the public. The goals of community relations programs include creating an understanding of EPA programs and related actions, assuring public input into decision-making processes related to affected communities, and making certain that the Agency is aware of, and responsive to, public concerns. Specific community relations activities are required in relation to Superfund cleanup actions [see Comment Period].

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): Congress enacted the CERCLA, known as Superfund, in 1980 to respond directly to hazardous waste problems that may pose a threat to the public health and the environment. The EPA administers the Superfund program.

Confluence: The place where two bodies of water, such as streams or rivers, come together.

Confined Aquifer: An aquifer in which groundwater is confined under pressure that is significantly greater than atmospheric pressure.

GLOSSARY

Consent Decree: A legal document, approved and issued by a judge, formalizing an agreement between the EPA and the parties potentially responsible for site contamination. The decree describes cleanup actions that the potentially responsible parties are required to perform, or the costs incurred by the government that the parties will reimburse, and the roles, responsibilities, and enforcement options that the government may exercise in the event of non-compliance by potentially responsible parties. If a settlement between the EPA and a potentially responsible party includes cleanup actions, it must be in the form of a Consent Decree. A Consent Decree is subject to a public comment period.

Consent Order: [see Administrative Order on Consent].

Containment: The process of enclosing or containing hazardous substances in a structure, typically in a pond or a lagoon, to prevent the migration of contaminants into the environment.

Contaminant: Any physical, chemical, biological, or radiological material or substance whose quantity, location, or nature produces undesirable health or environmental effects.

Contingency Plan: A document setting out an organized, planned, and coordinated course of action to be followed in case of a fire, explosion, or other accident that releases toxic chemicals, hazardous wastes, or radioactive materials into the environment.

Cooperative Agreement: A contract between the EPA and the States, wherein a State agrees to manage or monitor certain site cleanup responsibilities and other activities on a cost-sharing basis.

Cost Recovery: A legal process by which potentially responsible parties can be required to pay back the Superfund program for money

it spends on any cleanup actions [see Potentially Responsible Parties].

Cover: Vegetation or other material placed over a landfill or other waste material. It can be designed to reduce movement of water into the waste and to prevent erosion that could cause the movement of contaminants.

Creosotes: Chemicals used in wood preserving operations and produced by distillation of tar, including polycyclic aromatic hydrocarbons and polynuclear aromatic hydrocarbons [see PAHs and PNAs]. Contaminating sediments, soils, and surface water, creosotes may cause skin ulcerations and cancer through prolonged exposure.

Culvert: A pipe used for drainage under a road, railroad track, path, or through an embankment.

Decommission: To revoke a license to operate and take out of service.

Degradation: The process by which a chemical is reduced to a less complex form.

Degrease: To remove grease from wastes, soils, or chemicals, usually using solvents.

Deletion: A site is eligible for deletion from the NPL when Superfund response actions at the site are complete. A site is deleted from the NPL when a notice is published in the Federal Register.

De minimis: This legal phrase pertains to settlements with parties who contributed small amounts of hazardous waste to a site. This process allows the EPA to settle with small, or *de minimis* contributors, as a single group rather than as individuals, saving time, money, and effort.

Dewater: To remove water from wastes, soils, or chemicals.

GLOSSARY

Dike: A low wall that can act as a barrier to prevent a spill from spreading.

Dioxin: An organic chemical by-product of pesticide manufacture which is known to be one of the most toxic man-made chemicals.

Disposal: Final placement or destruction of toxic, radioactive, or other wastes; surplus or banned pesticides or other chemicals; polluted soils; and drums containing hazardous materials. Disposal may be accomplished through the use of approved secure landfills, surface impoundments, land farming, deep well injection, or incineration.

Downgradient: A downward hydrologic slope that causes groundwater to move toward lower elevations. Therefore, wells *downgradient* of a contaminated groundwater source are prone to receiving pollutants.

Ecological Assessment: A study of the impact of man-made or natural activity on living creatures and their environment.

Effluent: Wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Emission: Pollution discharged into the atmosphere from smokestacks, other vents, and surface areas of commercial or industrial facilities.

Emulsifiers: Substances that help in mixing materials that do not normally mix; e.g., oil and water.

Endangerment Assessment: A study conducted to determine the risks posed to public health or the environment by contamination at NPL sites. The EPA or the State conducts the study when a legal action is to be taken to direct the potentially responsible parties to clean up a site or pay for the cleanup. An endangerment

assessment supplements an investigation of the site hazards.

Enforcement: EPA, State, or local legal actions taken against parties to facilitate settlements; to compel compliance with laws, rules, regulations, or agreements; or to obtain penalties or criminal sanctions for violations. Enforcement procedures may vary, depending on the specific requirements of different environmental laws and related regulatory requirements. Under CERCLA, for example, the EPA will seek to require potentially responsible parties to clean up a Superfund site or pay for the cleanup [see Cost Recovery].

Erosion: The wearing away of land surface by wind or water. Erosion occurs naturally from weather or surface runoff, but can be intensified by such land-related practices as farming, residential or industrial development, road building, or timber-cutting. Erosion may spread surface contamination to off-site locations.

Estuary (estuarine): Areas where fresh water from rivers and salt water from nearshore ocean waters are mixed. These areas may include bays, mouths of rivers, salt marshes, and lagoons. These water ecosystems shelter and feed marine life, birds, and wildlife.

Evaporation Ponds: Areas where sewage sludge or other watery wastes are dumped and allowed to dry out.

Feasibility Study: The analysis of the potential cleanup alternatives for a site. The feasibility study usually starts as soon as the remedial investigation is underway. In this volume, the feasibility study is referred to as a site study [see also Remedial Investigation].

GLOSSARY

Filtration: A treatment process for removing solid (particulate) matter from water by passing the water through sand, activated carbon, or a man-made filter. The process is often used to remove particles that contain contaminants.

Flood Plain: An area along a river, formed from sediment deposited by floods. Flood plains periodically are inundated by natural floods, which can spread contamination.

Flue Gas: The air that is emitted from a chimney after combustion in the burner occurs. The gas can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, particles, and many chemical pollutants.

Fly Ash: Non-combustible residue that results from the combustion of flue gases. It can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, as well as many other chemical pollutants.

French Drain System: A crushed rock drain system constructed of perforated pipes, which is used to drain and disperse wastewater.

Gasification (coal): The conversion of soft coal into gas for use as a fuel.

General Notice Letter: [See Notice Letter].

Generator: A facility that emits pollutants into the air or releases hazardous wastes into water or soil.

Good Faith Offer: A voluntary offer, generally in response to a Special Notice letter, made by a potentially responsible party, consisting of a written proposal demonstrating a potentially responsible party's qualifications and willingness to perform a site study or cleanup.

Groundwater: Water that fills pores in soils or openings in rocks to the point of saturation. In aquifers, groundwater occurs in sufficient

quantities for use as drinking and irrigation water and other purposes.

Groundwater Quality Assessment: The process of analyzing the chemical characteristics of groundwater to determine whether any hazardous materials exist.

Halogens: Reactive non-metals, such as chlorine and bromine. Halogens are very good oxidizing agents and, therefore, have many industrial uses. They are rarely found by themselves; however, many chemicals such as polychlorinated biphenyls (PCBs), some volatile organic compounds (VOCs), and dioxin are reactive because of the presence of halogens.

Hazard Ranking System (HRS): The principal screening tool used by the EPA to evaluate relative risks to public health and the environment associated with abandoned or uncontrolled hazardous waste sites. The HRS calculates a score based on the potential of hazardous substances spreading from the site through the air, surface water, or groundwater and on other factors such as nearby population. The HRS score is the primary factor in deciding if the site should be on the NPL.

Hazardous Waste: By-products of society that can pose a substantial present or potential hazard to human health and the environment when improperly managed. Hazardous waste possesses at least one of four characteristics (ignitability, corrosivity, reactivity, or toxicity), or appears on special EPA lists.

Heavy Metals: Metallic elements with high atomic weights, such as arsenic, lead, mercury, and cadmium. Heavy metals are very hazardous even at low concentrations and tend to accumulate in the food chain.

Herbicide: A chemical pesticide designed to control or destroy plants, weeds, or grasses.

GLOSSARY

Hot Spot: An area or vicinity of a site containing exceptionally high levels of contamination.

Hydrocarbons: Chemical compounds that consist entirely of hydrogen and carbon.

Hydrology: The properties, distribution, and circulation of water.

Hydrogeology: The geology of groundwater, with particular emphasis on the chemistry and movement of water.

Impoundment: A body of water or sludge confined by a dam, dike, floodgate, or other barrier.

Incineration: A group of treatment technologies involving destruction of waste by controlled burning at high temperatures, e.g., burning sludge to reduce the remaining residues to a non-burnable ash that can be disposed of safely on land, in some waters, or in underground locations.

Infiltration: The movement of water or other liquid down through soil from precipitation (rain or snow) or from application of wastewater to the land surface.

Influent: Water, wastewater, or other liquid flowing into a reservoir, basin, or treatment plant.

Injection Well: A well into which waste fluids are placed, under pressure, for purposes of disposal.

Inorganic Chemicals: Chemical substances of mineral origin, not of basic carbon structure.

Installation Restoration Program: The specially funded program established in 1978 under which the Department of Defense has been identifying and evaluating its hazardous waste sites and controlling the migration of hazardous contaminants from those sites.

Intake: The source from where a water supply is drawn, such as from a river or water body.

Interagency Agreement: A written agreement between the EPA and a Federal agency that has the lead for site cleanup activities, setting forth the roles and responsibilities of the agencies for performing and overseeing the activities. States often are parties to interagency agreements.

Interim (Permit) Status: Conditions under which hazardous waste treatment, storage, and disposal facilities, that were operating when regulations under the RCRA became final in 1980, are temporarily allowed by the EPA to continue to operate while awaiting denial or issuance of a permanent permit. The facility must comply with certain regulations to maintain interim status.

Lagoon: A shallow pond or liquid waste containment structure. Lagoons typically are used for the storage of wastewaters, sludges, liquid wastes, or spent nuclear fuel.

Landfarm: To apply waste to land or incorporate waste into the surface soil, such as fertilizer or soil conditioner. This practice commonly is used for disposal of composted wastes and sludges.

Landfill: A disposal facility where waste is placed in or on land. *Sanitary* landfills are disposal sites for non-hazardous solid wastes. The waste is spread in layers, compacted to the smallest practical volume, and covered with soil at the end of each operating day. *Secure chemical* landfills are disposal sites for hazardous waste. They are designed to minimize the chance of release of hazardous substances into the environment [see Resource Conservation and Recovery Act].

Leach, Leaching [v.t.]: The process by which soluble chemical components are dissolved and carried through soil by water or some other percolating liquid.

GLOSSARY

Leachate [n]: The liquid that trickles through or drains from waste, carrying soluble components from the waste.

Leachate Collection System: A system that gathers liquid that has leaked into a landfill or other waste disposal area and pumps it to the surface for treatment.

Liner: A relatively impermeable barrier designed to prevent leachate (waste residue) from leaking from a landfill. Liner materials include plastic and dense clay.

Long-term Remedial Phase: Distinct, often incremental, steps that are taken to solve site pollution problems. Depending on the complexity, site cleanup activities can be separated into several of these phases.

Long-term Response Action: An action which requires a continuous period of on-site activity before cleanup goals are achieved. These actions typically include the extraction and treatment of groundwater and monitoring actions.

Marsh: A type of wetland that does not contain peat moss deposits and is dominated by vegetation. Marshes may be either fresh or saltwater and tidal or non-tidal [see Wetland].

Migration: The movement of oil, gas, contaminants, water, or other liquids through porous and permeable soils or rock.

Mill Tailings: [See Mine Tailings].

Mine Tailings: A fine, sandy residue left from mining operations. Tailings often contain high concentrations of lead, uranium, and arsenic or other heavy metals.

Mitigation: Actions taken to improve site conditions by limiting, reducing, or controlling toxicity and contamination sources.

Modeling: A technique using a mathematical or physical representation of a system or theory that tests the effects that changes on system components have on the overall performance of the system.

Monitoring Wells: Special wells drilled at specific locations within, or surrounding, a hazardous waste site where groundwater can be sampled at selected depths and studied to obtain such information as the direction in which groundwater flows and the types and amounts of contaminants present.

National Priorities List (NPL): The EPA's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term cleanup under Superfund. The EPA is required to update the NPL at least once a year.

Natural Attenuation: [See Attenuation].

Neutrals: Organic compounds that have a relatively neutral pH, complex structure and, due to their organic bases, are easily absorbed into the environment. Water is the most commonly known neutral, however, naphthalene, pyrene, and trichlorobenzene also are examples of neutrals.

Nitroaromatics: Common components of explosive materials, which will explode if activated by very high temperatures or pressures; 2,4,6-Trinitrotoluene (TNT) is a nitroaromatic.

Notice Letter: A General Notice Letter notifies the parties potentially responsible for site contamination of their possible liability. A Special Notice Letter begins a 60-day formal period of negotiation during which the EPA is not allowed to start work at a site or initiate enforcement actions against potentially responsible parties, although the EPA may undertake certain investigatory and planning activities.

The 60-day period may be extended if the EPA receives a good faith offer from the PRPs within that period. [See also Good Faith Offer].

On-Scene Coordinator (OSC): The predesignated EPA, Coast Guard, or Department of Defense official who coordinates and directs Superfund removal actions or Clean Water Act oil- or hazardous-spill corrective actions.

Operation and Maintenance: Activities conducted at a site after a cleanup action is completed to ensure that the cleanup or containment system is functioning properly.

Organic Chemicals/Compounds: Chemical substances containing mainly carbon, hydrogen, and oxygen.

Outfall: The place where wastewater is discharged into receiving waters.

Overpacking: Process used for isolating large volumes of waste by jacketing or encapsulating waste to prevent further spread or leakage of contaminating materials. Leaking drums may be contained within oversized barrels as an interim measure prior to removal and final disposal.

Pentachlorophenol (PCP): A synthetic, modified petrochemical that may be used as a wood preservative because of its toxicity to termites and fungi. It is a common component of creosotes and can cause cancer.

Perched (groundwater): Groundwater separated from another underlying body of groundwater by a confining layer, often clay or rock.

Percolation: The downward flow or filtering of water or other liquids through subsurface rock or soil layers, usually continuing downward to groundwater.

Pesticide: A substance or mixture of substances intended to prevent, destroy, or repel any pest. If misused, pesticides can accumulate in the foodchain and contaminate the environment.

Petrochemicals: Chemical substances produced from petroleum in refinery operations and as fuel oil residues. These include fluoranthene, chrysene, mineral spirits, and refined oils. Petrochemicals are the bases from which volatile organic compounds (VOCs), plastics, and many pesticides are made. These chemical substances often are toxic to humans and the environment.

Phenols: Organic compounds that are used in plastics manufacturing and are by-products of petroleum refining, tanning, textile, dye, and resin manufacturing. Phenols are highly poisonous.

Physical Chemical Separation: The treatment process of adding a chemical to a substance to separate the compounds for further treatment or disposal.

Pilot Testing: A small-scale test of a proposed treatment system in the field to determine its ability to clean up specific contaminants.

Plugging: The process of stopping the flow of water, oil, or gas into or out of the ground through a borehole or well penetrating the ground.

Plume: A body of contaminated groundwater flowing from a specific source. The movement of the groundwater is influenced by such factors as local groundwater flow patterns, the character of the aquifer in which groundwater is contained, and the density of contaminants [see Migration].

Pollution: Generally, the presence of matter or energy whose nature, location, or quantity produces undesired health or environmental effects.

GLOSSARY

Polycyclic Aromatic Hydrocarbons or Polyaromatic Hydrocarbons (PAHs):

PAHs, such as pyrene, are a group of highly reactive organic compounds found in motor oil. They are a common component of creosotes and can cause cancer.

Polychlorinated Biphenyls (PCBs): A group of toxic chemicals used for a variety of purposes including electrical applications, carbonless copy paper, adhesives, hydraulic fluids, microscope immersion oils, and caulking compounds. PCBs also are produced in certain combustion processes. PCBs are extremely persistent in the environment because they are very stable, non-reactive, and highly heat resistant. Chronic exposure to PCBs is believed to cause liver damage. It also is known to bioaccumulate in fatty tissues. PCB use and sale was banned in 1979 with the passage of the Toxic Substances Control Act.

Polynuclear Aromatic Hydrocarbons (PNAs): PNAs, such as naphthalene, and biphenyls, are a group of highly reactive organic compounds that are a common component of creosotes, which can be carcinogenic.

Polyvinyl Chloride (PVC): A plastic made from the gaseous substance vinyl chloride. PVC is used to make pipes, records, raincoats, and floor tiles. Health risks from high concentrations of vinyl chloride include liver cancer and lung cancer, as well as cancer of the lymphatic and nervous systems.

Potable Water: Water that is safe for drinking and cooking.

Potentially Responsible Parties (PRPs):

Parties associated with a Superfund site who may be liable for the cost of remedying the release of hazardous substances. This may include owners or operators of the site or transporters who disposed of materials at the site. PRPs may admit liability, or liability may be determined by a court of law. PRPs may sign a

Consent Decree or Administrative Order on Consent to participate in the site cleanup without admitting liability.

Precipitation: The removal of solids from liquid waste so that the solid and liquid portions can be disposed of safely; the removal of particles from airborne emissions. Electrochemical precipitation is the use of an anode or cathode to remove the hazardous chemicals. Chemical precipitation involves the addition of some substance to cause the solid portion to separate.

Preliminary Assessment: The process of collecting and reviewing available information about a known or suspected waste site or release to determine if a threat or potential threat exists.

Pump and Treat: A groundwater cleanup technique involving the extracting of contaminated groundwater from the subsurface and the removal of contaminants, using one of several treatment technologies.

Radionuclides: Elements, including radium and uranium-235 and -238, which break down and produce radioactive substances due to their unstable atomic structure. Some are man-made, and others are naturally occurring in the environment. Radon, the gaseous form of radium, decays to form alpha particle radiation, which cannot be absorbed through skin. However, it can be inhaled, which allows alpha particles to affect unprotected tissues directly and thus cause cancer. Radiation also occurs naturally through the breakdown of granite.

RCRA: [See Resource Conservation and Recovery Act].

Recharge Area: A land area where rainwater saturates the ground and soaks through the earth to reach an aquifer.

Record of Decision (ROD): A public document that explains which cleanup alternative(s) will be used to clean up sites listed on the NPL. It is based on information generated during the remedial investigation and feasibility study and consideration of public comments and community concerns.

Recovery Wells: Wells used to withdraw contaminants or contaminated groundwater.

Recycle: The process of minimizing waste generation by recovering usable products that might otherwise become waste.

Remedial Action (RA): The actual construction or implementation phase of a Superfund site cleanup following the remedial design [see Cleanup].

Remedial Design: A phase of site cleanup where engineers design the technical specifications for cleanup remedies and technologies.

Remedial Investigation: An in-depth study designed to gather the data necessary to determine the nature and extent of contamination at a Superfund site, establish the criteria for cleaning up the site, identify the preliminary alternatives for cleanup actions, and support the technical and cost analyses of the alternatives. The remedial investigation is usually done with the feasibility study. In this volume, the remedial investigation is referred to as a site study [see also Feasibility Study].

Remedial Project Manager (RPM): The EPA or State official responsible for overseeing cleanup actions at the site.

Remedy Selection: The selection of the final cleanup strategy for the site. At the few sites where the EPA has determined that initial response actions have eliminated site contamination, or that any remaining con-

tamination will be naturally dispersed without further cleanup activities, a "No Action" remedy is selected [see Record of Decision].

Removal Action: Short-term immediate actions taken to address releases of hazardous substances [see Cleanup].

Residual: The amount of a pollutant remaining in the environment after a natural or technological process has taken place, e.g., the sludge remaining after initial wastewater treatment, or the particulates remaining in air after the air passes through a scrubber.

Resource Conservation and Recovery Act (RCRA): A Federal law that established a regulatory system to track hazardous substances from the time of generation to disposal. The law requires safe and secure procedures to be used in treating, transporting, storing, and disposing of hazardous substances. RCRA is designed to prevent new, uncontrolled hazardous waste sites.

Retention Pond: A small body of liquid used for disposing of wastes and containing overflow from production facilities. Sometimes retention ponds are used to expand the capacity of such structures as lagoons to store waste.

Runoff: The discharge of water over land into surface water. It can carry pollutants from the air and land and spread contaminants from its source.

Scrubber: An air pollution control device that uses a spray of water or reactant or a dry process to trap pollutants in emissions.

Sediment: The layer of soil, sand, and minerals at the bottom of surface waters such as streams, lakes, and rivers, that absorbs contaminants.

GLOSSARY

Seeps: Specific points where releases of liquid, usually leachate, form from waste disposal areas, particularly along the lower edges of landfills.

Seepage Pits: A hole, shaft, or cavity in the ground used for the storage of liquids, usually in the form of leachate, from waste disposal areas. The liquid gradually leaves the pit by moving through the surrounding soil.

Septage: Residue remaining in a septic tank after the treatment process.

Sinkhole: A hollow depression in the land surface in which drainage collects; associated with underground caves and passages that facilitate the movement of liquids.

Site Characterization: The technical process used to evaluate the nature and extent of environmental contamination, which is necessary for choosing and designing cleanup measures and monitoring their effectiveness.

Site Inspection: The collection of information from a hazardous waste site to determine the extent and severity of hazards posed by the site. It follows, and is more extensive than, a preliminary assessment. The purpose is to gather information necessary to score the site, using the Hazard Ranking System, and to determine if the site presents an immediate threat that requires a prompt removal action.

Slag: The fused refuse or dross separated from a metal in the process of smelting.

Sludge: Semi-solid residues from industrial or water treatment processes that may be contaminated with hazardous materials.

Slurry Wall: Barriers used to contain the flow of contaminated groundwater or subsurface

liquids. Slurry walls are constructed by digging a trench around a contaminated area and filling the trench with an impermeable material that prevents water from passing through it. The groundwater or contaminated liquids trapped within the area surrounded by the slurry wall can be extracted and treated.

Smelter: A facility that melts or fuses ore, often with an accompanying chemical change, to separate the metal. Emissions from smelters are known to cause pollution.

Soil Gas: Gaseous elements and compounds that occur in the small spaces between particles of soil. Such gases can move through or leave the soil or rock, depending on changes in pressure.

Soil Vapor Extraction: A treatment process that uses vacuum wells to remove hazardous gases from soil.

Soil Washing: A water-based process for mechanically scrubbing soils in-place to remove undesirable materials. There are two approaches: dissolving or suspending them in the wash solution for later treatment by conventional methods, and concentrating them into a smaller volume of soil through simple particle size separation techniques [see Solvent Extraction].

Stabilization: The process of changing an active substance into inert, harmless material, or physical activities at a site that act to limit the further spread of contamination without actual reduction of toxicity.

Solidification/Stabilization: A chemical or physical reduction of the mobility of hazardous constituents. Mobility is reduced through the binding of hazardous constituents into a solid mass with low permeability and resistance to leaching.

Solvent: A substance capable of dissolving another substance to form a solution. The primary uses of industrial solvents are as cleaners for degreasing, in paints, and in pharmaceuticals. Many solvents are flammable and toxic to varying degrees.

Solvent Extraction: A means of separating hazardous contaminants from soils, sludges, and sediment, thereby reducing the volume of the hazardous waste that must be treated. It generally is used as one in a series of unit operations. An organic chemical is used to dissolve contaminants as opposed to water-based compounds, which usually are used in soil washing.

Sorption: The action of soaking up or attracting substances. It is used in many pollution control systems.

Special Notice Letter: [See Notice Letter].

Stillbottom: Residues left over from the process of recovering spent solvents.

Stripping: A process used to remove volatile contaminants from a substance [see Air Stripping].

Sumps: A pit or tank that catches liquid runoff for drainage or disposal.

Superfund: The program operated under the legislative authority of the CERCLA and Superfund Amendments and Reauthorization Act (SARA) to update and improve environmental laws. The program has the authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health, welfare, or the environment. The "Superfund" is a trust fund that finances cleanup actions at hazardous waste sites.

Surge Tanks: A holding structure used to absorb irregularities in flow of liquids, including liquid waste materials.

Swamp: A type of wetland that is dominated by woody vegetation and does not accumulate peat moss deposits. Swamps may be fresh or saltwater and tidal or non-tidal [see Wetlands].

Thermal Treatment: The use of heat to remove or destroy contaminants from soil.

Treatability Studies: Testing a treatment method on contaminated groundwater, soil, etc., to determine whether and how well the method will work.

Trichloroethylene (TCE): A stable, colorless liquid with a low boiling point. TCE has many industrial applications, including use as a solvent and as a metal degreasing agent. TCE may be toxic to people when inhaled, ingested, or through skin contact and can damage vital organs, especially the liver [see Volatile Organic Compounds].

Unilateral [Administrative] Order: [see Administrative Order].

Upgradient: An upward hydrologic slope; demarks areas that are higher than contaminated areas and, therefore, are not prone to contamination by the movement of polluted groundwater.

Vacuum Extraction: A technology used to remove volatile organic compounds (VOCs) from soils. Vacuum pumps are connected to a series of wells drilled to just above the water table. The wells are sealed tightly at the soil surface, and the vacuum established in the soil draws VOC-contaminated air from the soil pores into the well, as fresh air is drawn down from the surface of the soil.

GLOSSARY

Vegetated Soil Cap: A cap constructed with graded soils and seed for vegetative growth, to prevent erosion [see Cap].

Vitrification: The process of electrically melting wastes and soils or sludges to bind the waste in a glassy, solid material more durable than granite or marble and resistant to leaching.

Volatile Organic Compounds (VOCs): VOCs are manufactured as secondary petrochemicals. They include light alcohols, acetone, trichloroethylene, perchloroethylene, dichloroethylene, benzene, vinyl chloride, toluene, and methylene chloride. These potentially toxic chemicals are used as solvents, degreasers, paints, thinners, and fuels. Because of their volatile nature, they readily evaporate into the air, increasing the potential exposure to humans. Due to their low water solubility, environmental persistence, and widespread industrial use, they are commonly found in soil and groundwater.

Waste Treatment Plant: A facility that uses a series of tanks, screens, filters, and other treatment processes to remove pollutants from water.

Wastewater: The spent or used water from individual homes or industries.

Watershed: The land area that drains into a stream or other water body.

Water Table: The upper surface of the groundwater.

Weir: A barrier to divert water or other liquids.

Wetland: An area that is regularly saturated by surface or groundwater and, under normal circumstances, is capable of supporting vegetation typically adapted for life in saturated soil conditions. Wetlands are critical to sustaining many species of fish and wildlife. Wetlands generally include swamps, marshes, and bogs. Wetlands may be either coastal or inland. Coastal wetlands have salt or brackish (a mixture of salt and fresh) water, and most have tides, while inland wetlands are non-tidal and freshwater. Coastal wetlands are an integral component of estuaries.

Wildlife Refuge: An area designated for the protection of wild animals, within which hunting and fishing are either prohibited or strictly controlled.

Some Common Contaminants at NPL Sites

Contaminant Category	Example Chemical Types	Sources	Potential Health Threats*
Heavy Metals	Arsenic, Barium, Beryllium, Cadmium, Cobalt, Copper, Chromium, Lead, Manganese, Mercury, Nickel, Silver, Selenium, Zinc	Electroplating, batteries, paint pigments, photography, smelting, thermometers, fluorescent lights, solvent recovery	Tumors, cancers, and kidney, brain, neurological, bone and liver damage
Volatile Organic Compounds (VOCs)	Trichloroethylene (TCE), Perchloroethylene (PCE), Acetone, Benzene, Ketone, Methyl chloride, Toluene, Vinyl Chloride, Dichloroethylene	Solvents and degreasers, gasoline octane enhancers, oils and paints, dry cleaning fluids, chemical manufacturing.	Cancers, kidney and liver damage, impairment of the nervous system resulting in sleepiness and headaches, leukemia
Pesticides/Herbicides	Chlordane, DDT 4-4, DDE, Heptachlor, Aldrin, Endrin, Atrazine, Dieldrin, Toxaphene	Agricultural applications, pesticide and herbicide production	Various effects ranging from nausea to nervous disorders. Dioxin is a common by-product of the manufacture of pesticides and is both highly toxic and a suspected carcinogen.
Polychlorinated biphenyls (PCBs)	—	Electric transformers and capacitors, insulators and coolants, adhesives, caulking compounds, carbonless copy paper, hydraulic fluids.	Cancer and liver damage.
Creosotes	Polycyclic aromatic hydrocarbons (PAHs), Polynuclear aromatics (PNAs), Phenolic tars, Pentachlorophenol (PCP)	Wood preserving, fossil fuel combustion	Cancers and skin ulcerations with prolonged exposure
Radiation (Radionuclides)	Radium-226, Radon, Uranium-235, Uranium-238	Mine tailings, radium products, natural decay of granites	Cancer

Sources: *Toxic Chemicals—What They Are, How They Affect You (EPA, Region 5)*
Glossary of Environmental Terms (EPA, 1988)

*The potential for risk due to these contaminants is linked to a number of factors; for example, the length and level of exposure and environmental and health factors such as age